RunControl

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RunControl &
RunConfiguration
09-Augl-2005

How to start, configure and operate **CDF RunControl**

Run Control, main window

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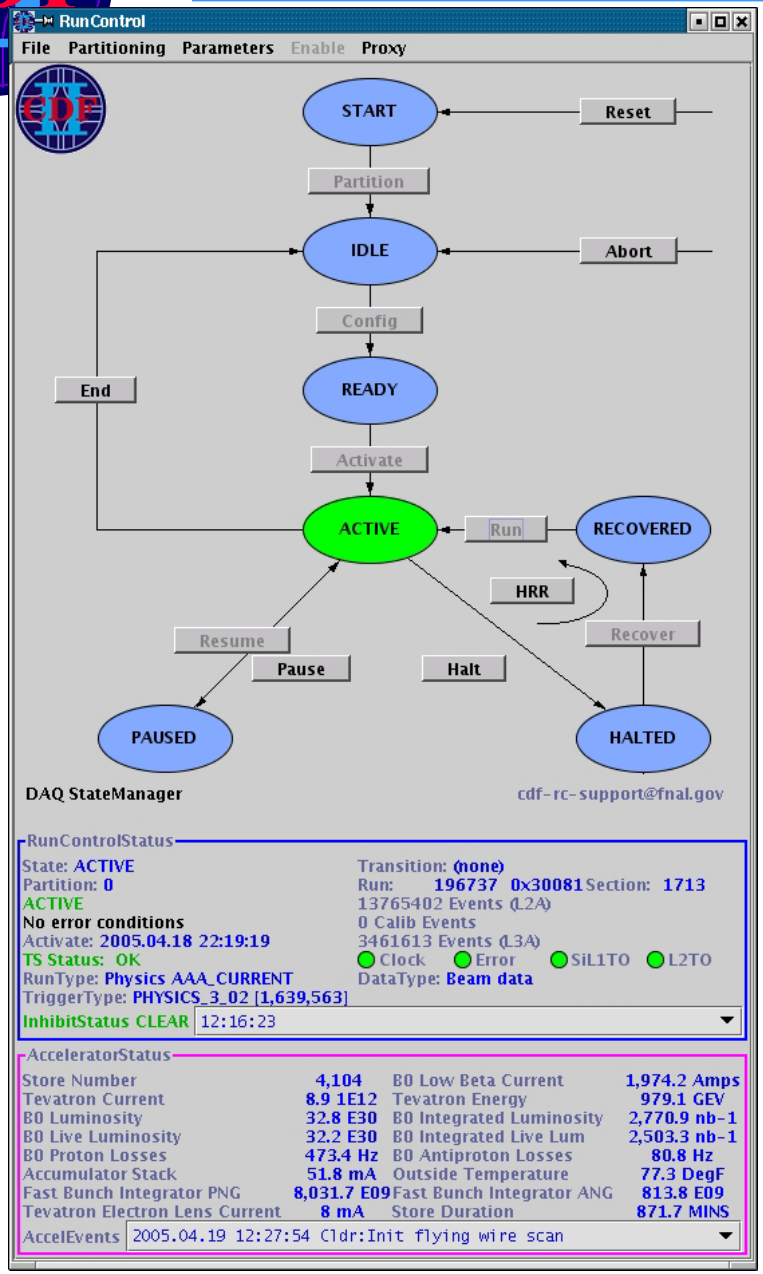

Main Run Control Window:
Includes State Manager, Configuration pull-down menus, Run Control Status, and Accelerator Status panels

Start Run Control:

setup fer

rc

(Aces use *cdfdaq* account)

Just 3 steps to run!

1. *Select Partition*
2. *Select Configuration*
3. *Initiate Transitions to get to Active State*

You're Running!

Select Partition

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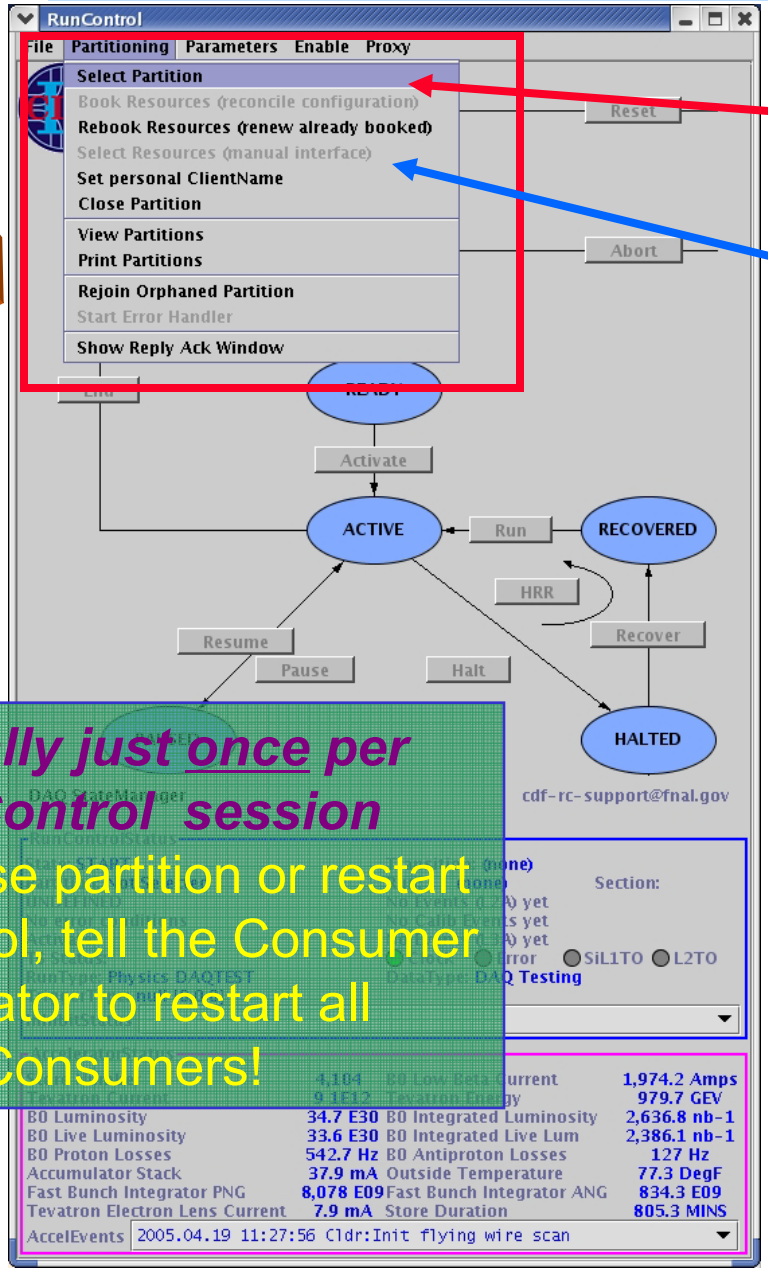

Step 1

Select partition

Select or view resources manually (via GUI)
(enabled after partition selected)

Normally just once per RunControl session
If you close partition or restart RunControl, tell the Consumer Operator to restart all Consumers!

Each RunControl Session must allocate one *Partition*

Each front-end crate belongs to no more than one *Partition*

Partitions allow resource locking and prevent collisions between different sessions via the *ResourceManager*

Partition Selector

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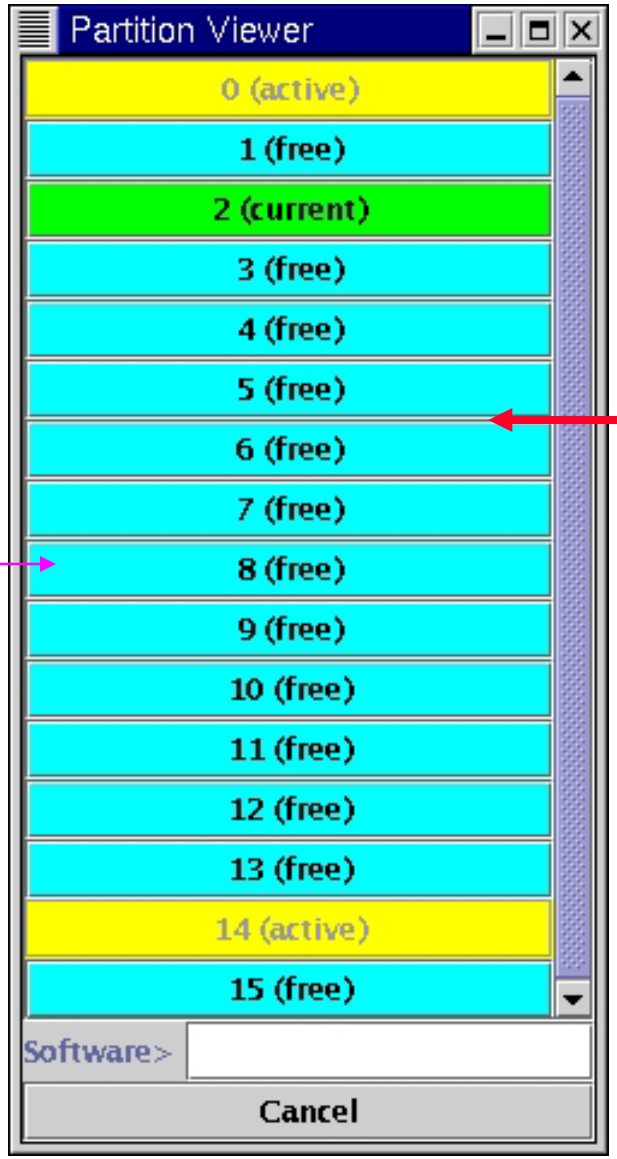

Select Partition:

- Cyan is free
- Yellow is owned by another
- Green is yours
- Mouse over to display owner and hardware/software status

- 0–7 hardware partitions
- 8 test stand partition
- 9–15 software partitions

Resource Selector

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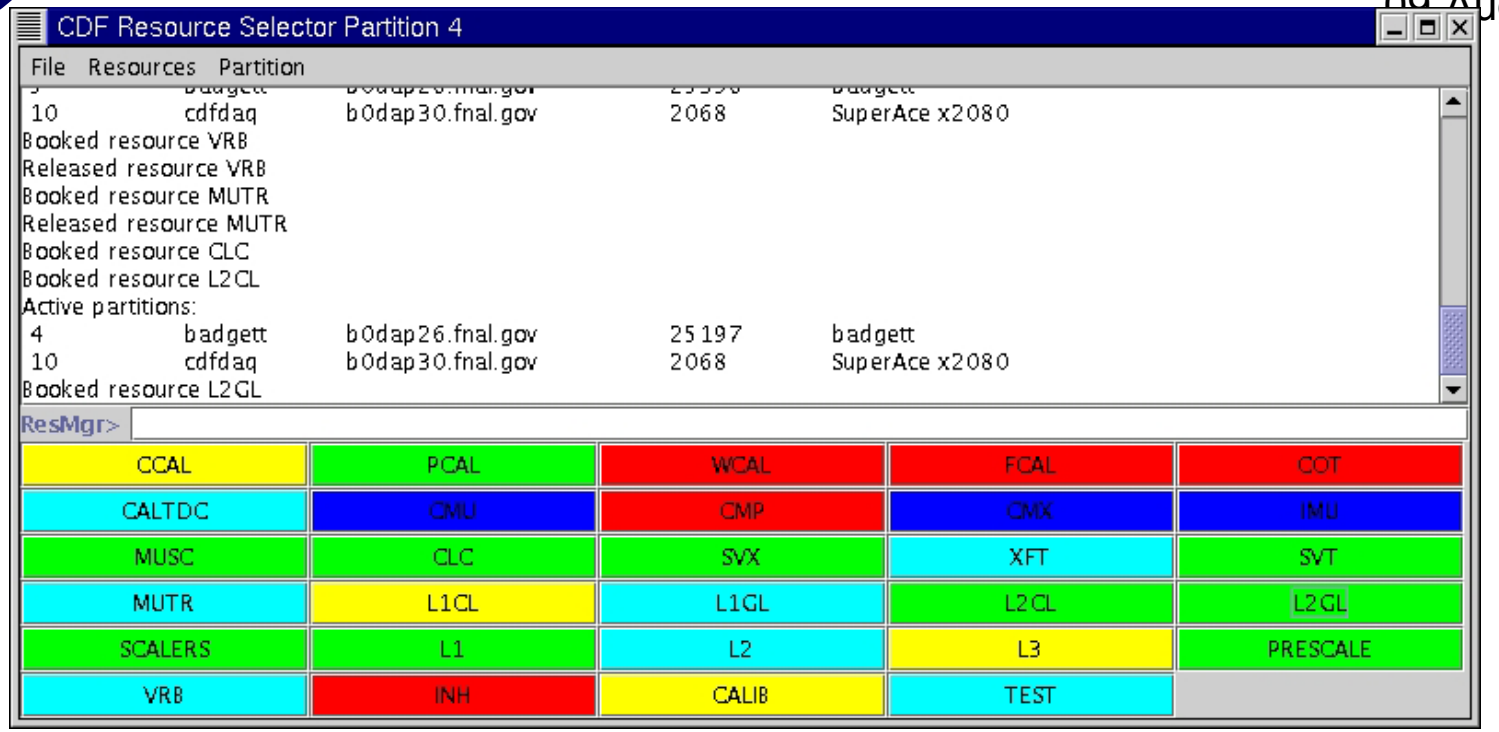

Select Resources:

- Cyan is entirely free
- Red is entirely owned by another partition
- Blue is partially owned by another partition
- Yellow is partially yours
- Green is entirely yours
- Mouse over to display owner
- Click to book/unbook; Right-click for more info, details

Selecting a RunConfiguration

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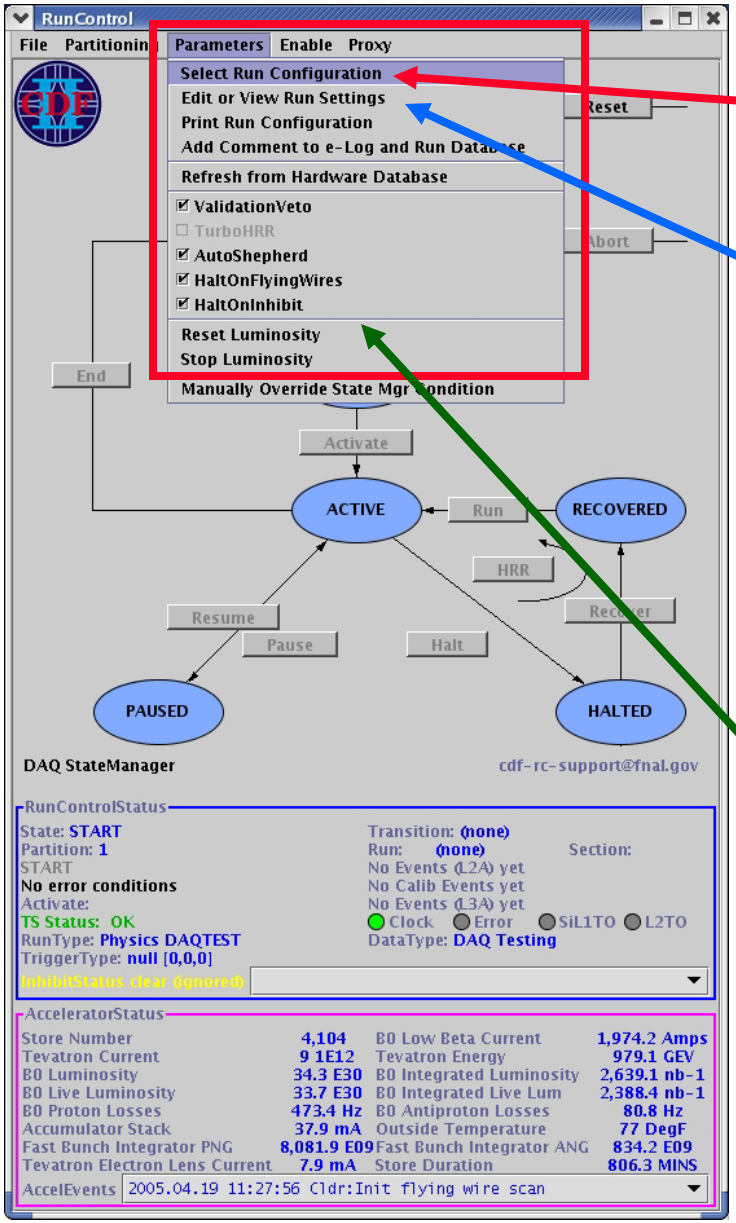
After selecting a configuration, you're ready to initiate transitions and take a run!



Select predefined run configuration

Edit or view run configuration

Frank sez: "This is the ace's most important duty!"

Reset or stop luminosity counters at beginning and end of stores -- *only if automatic reset fails!*

Run Configuration Selector

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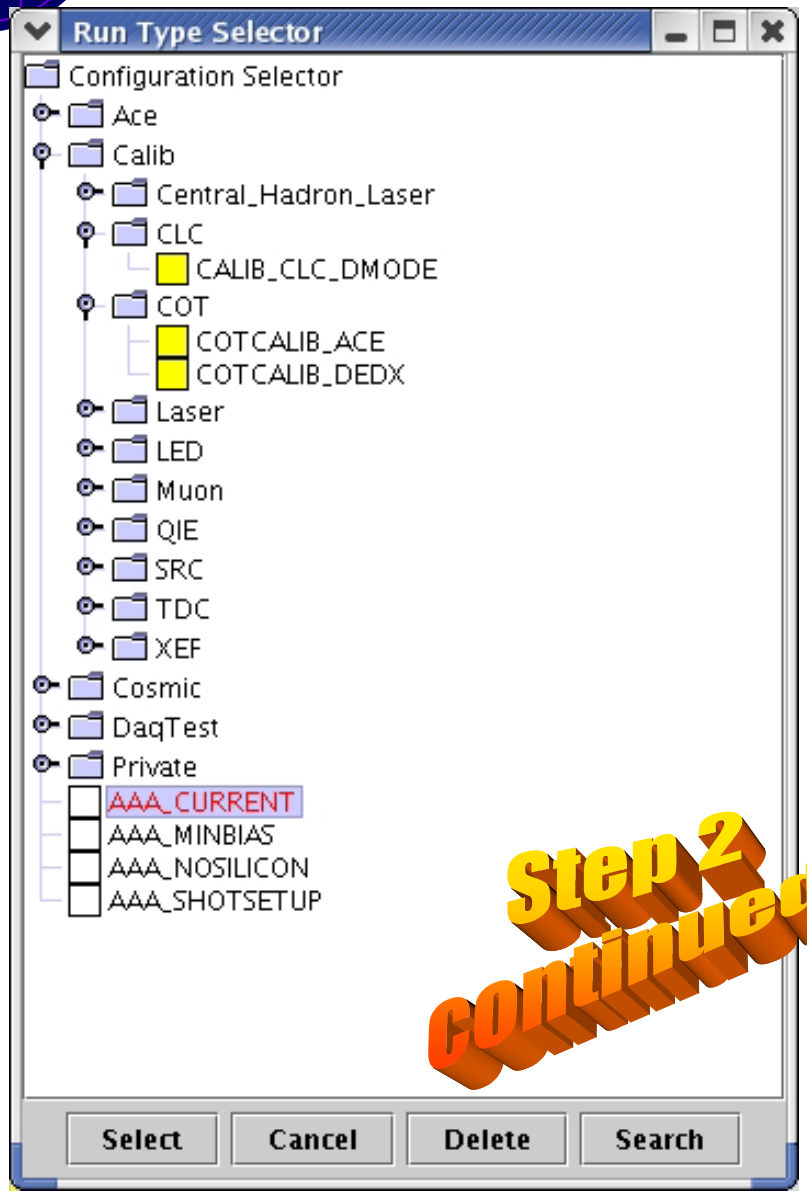

Select from predefined run configurations

- *Ace* directory contains all physics and test runs for the Ace, and is maintained by Ops Managers
- *Cosmic* directory for Cosmic Ray runs
- *Calib* directory contains calibration configurations, and is maintained by component experts in subdirectories
- Other directories for private testing purposes

Or create your own configuration!

RunSettings Window, standard

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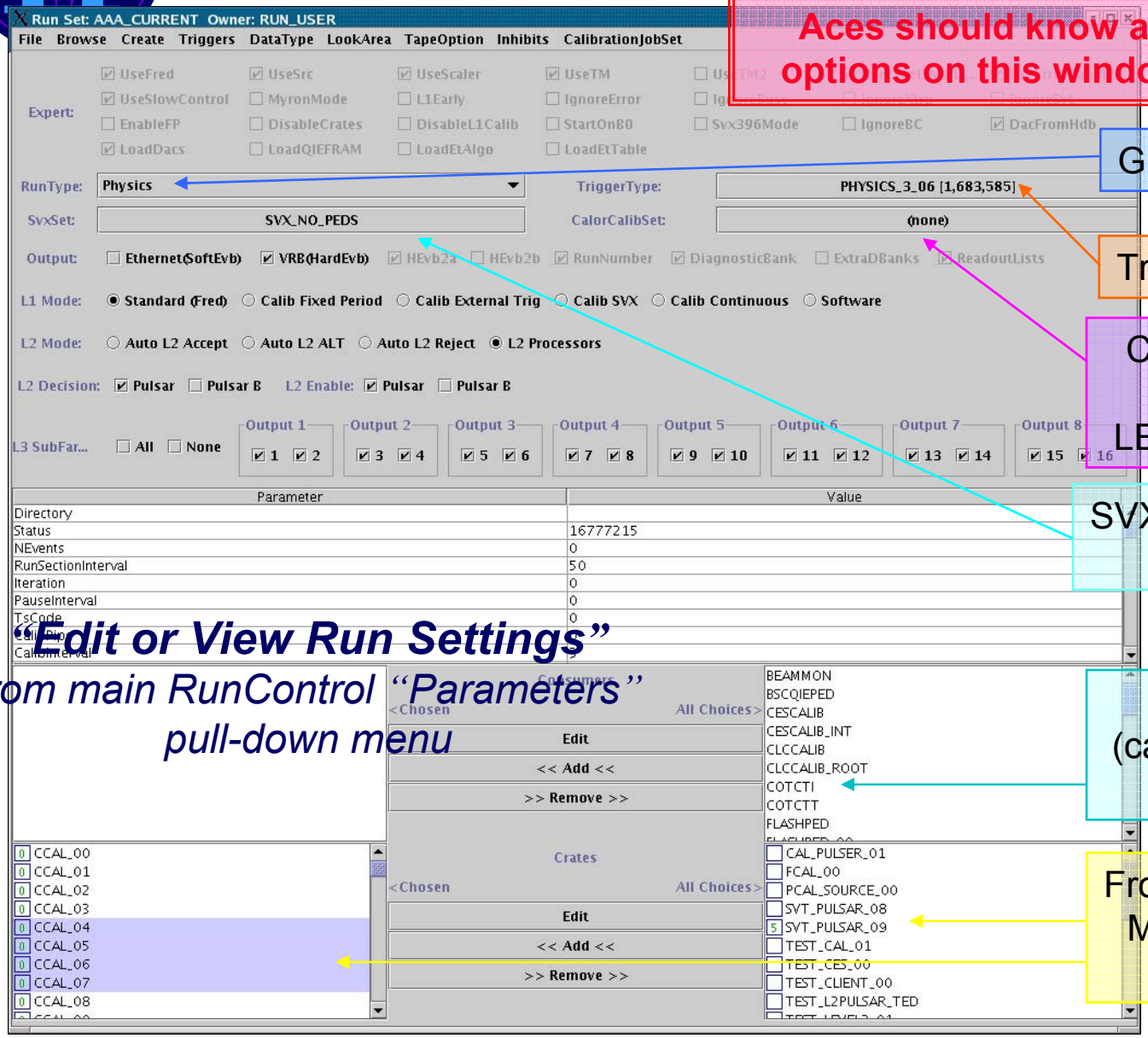
Aces should know all options on this window



Global DAQ RunType

Trigger Table, coupled

CalorCalibSet, when Plug source, LED, Xenon run types

SVX Set, when SVX is used Usually FIBTEST

"Edit or View Run Settings"

from main RunControl "Parameters" pull-down menu

Consumer Selection (calibration run types only for now)

Front end crate selection Move to left to include or right to exclude

Run Settings, expert options

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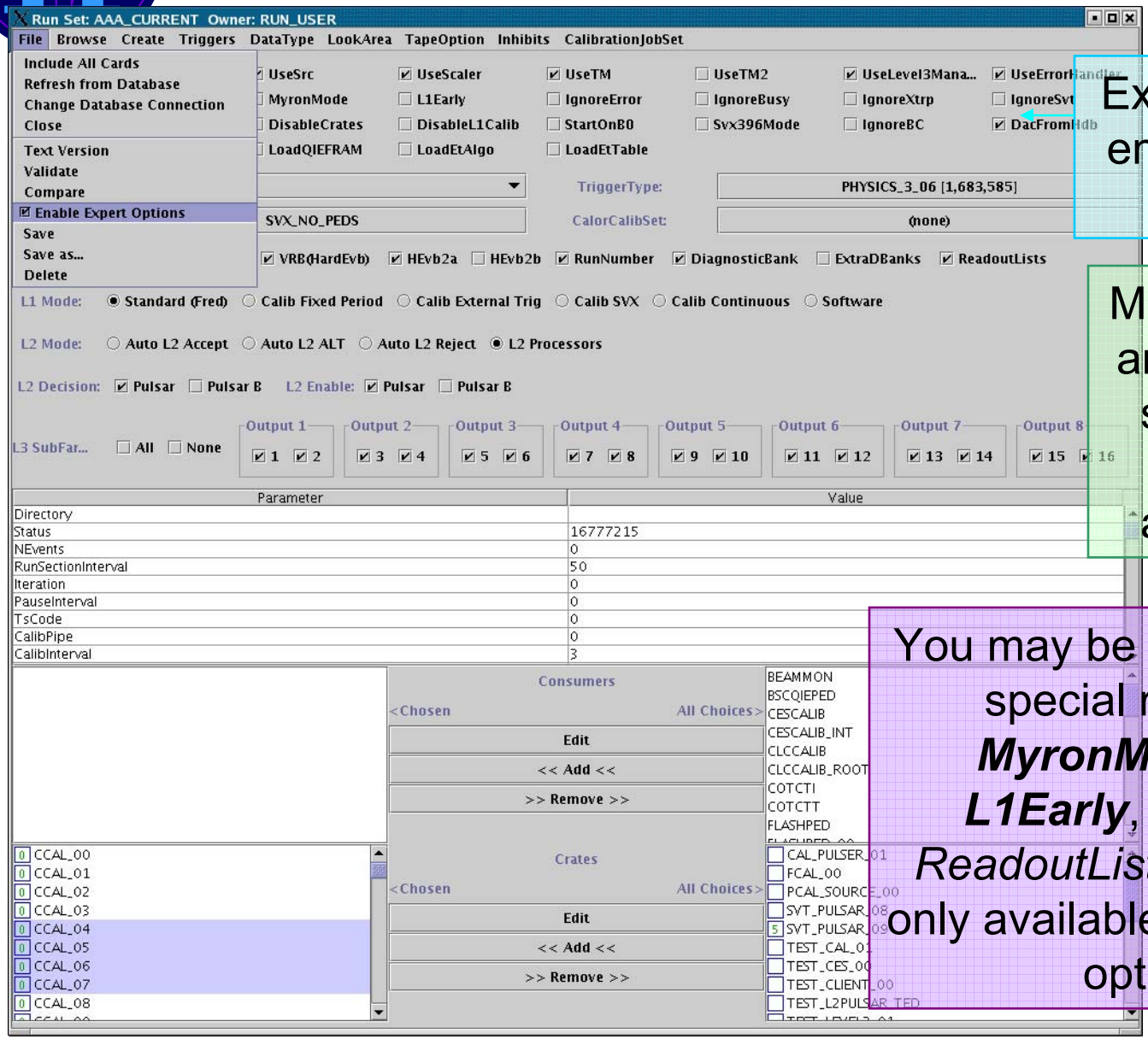

Expert options can be enabled from the *File* pull-down menu

Many expert options are triggered by the selection of other options or the addition of crates

You may be asked to take special runs, e.g. ***MyronMode*** with ***L1Early***, or without *ReadoutLists*, which are only available in the expert options

Trigger Inhibits

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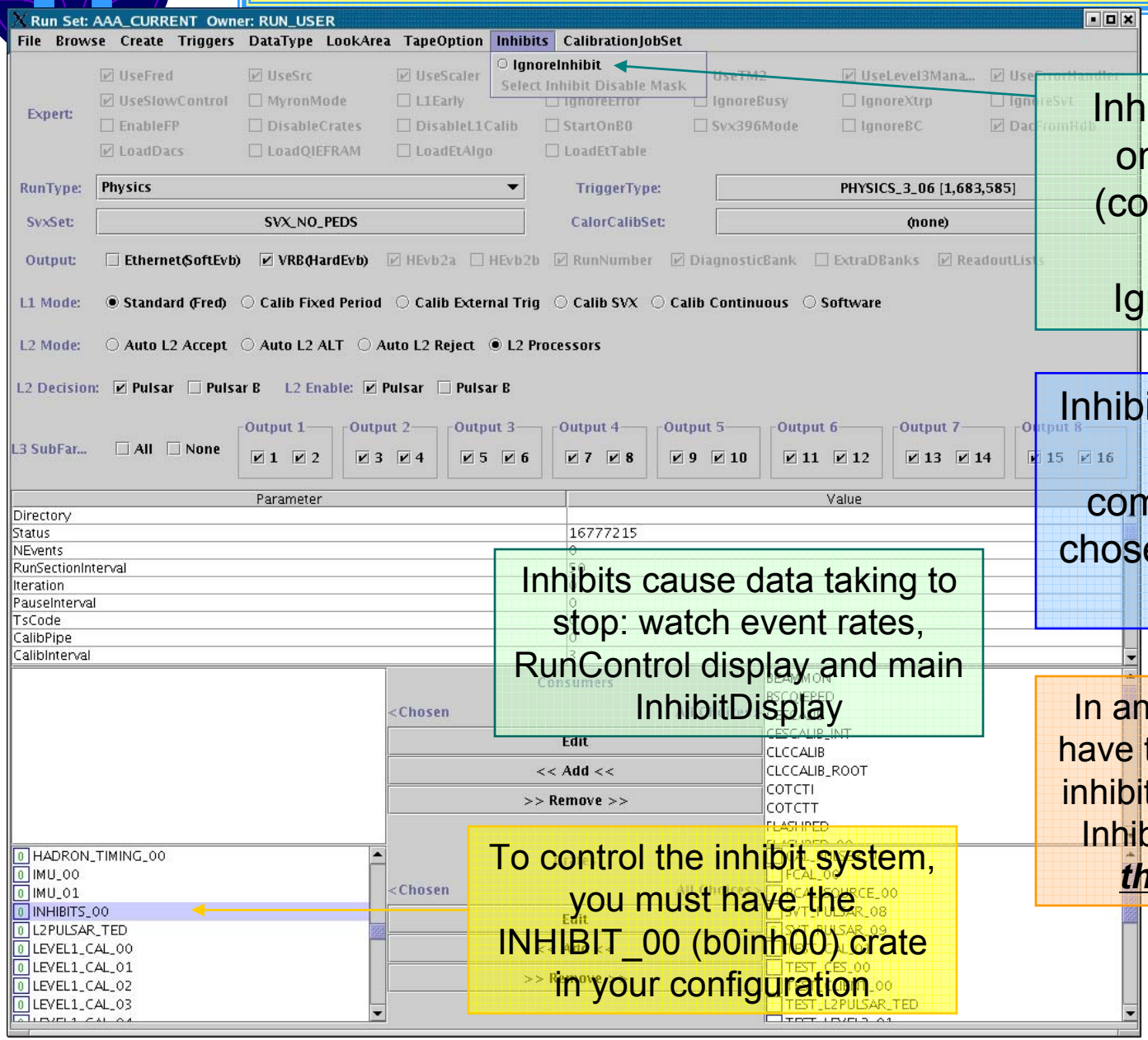

Inhibits normally used only during physics (colliding beam) runs, otherwise set IgnoreInhibit to true

Inhibit sources are tied to the crates and components you have chosen, and are selected automatically

Inhibits cause data taking to stop: watch event rates, RunControl display and main InhibitDisplay

In an emergency, you may have to disable misbehaving inhibit signals from the main InhibitDisplay GUI ***before the run is activated***

To control the inhibit system, you must have the INHIBIT_00 (b0inh00) crate in your configuration

Trigger Inhibit on RunControl

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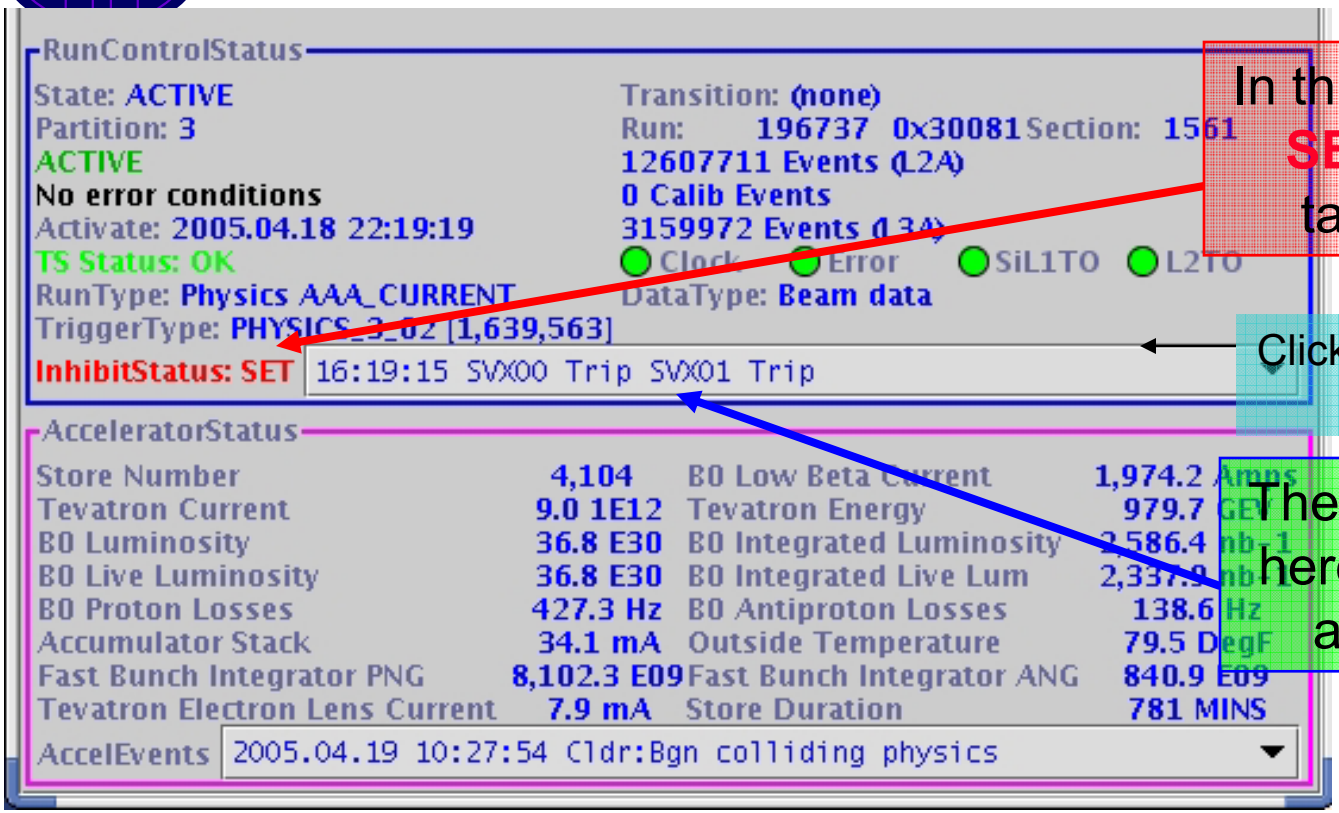

In this case, the Inhibit is **SET**, indicating data taking has stopped

Click on the pop-up to get a history of trips

The guilty components here are TRIP:SVX00 and TRIP:SVX01

RunControl crate: **INHIBITS_00** *b0inh00*

Jonatron sez:
"Selecting the Inhibitions is the Ace's most important duty!"

This is the *new* Inhibit system from
…December 2003…

New Inhibit System Control

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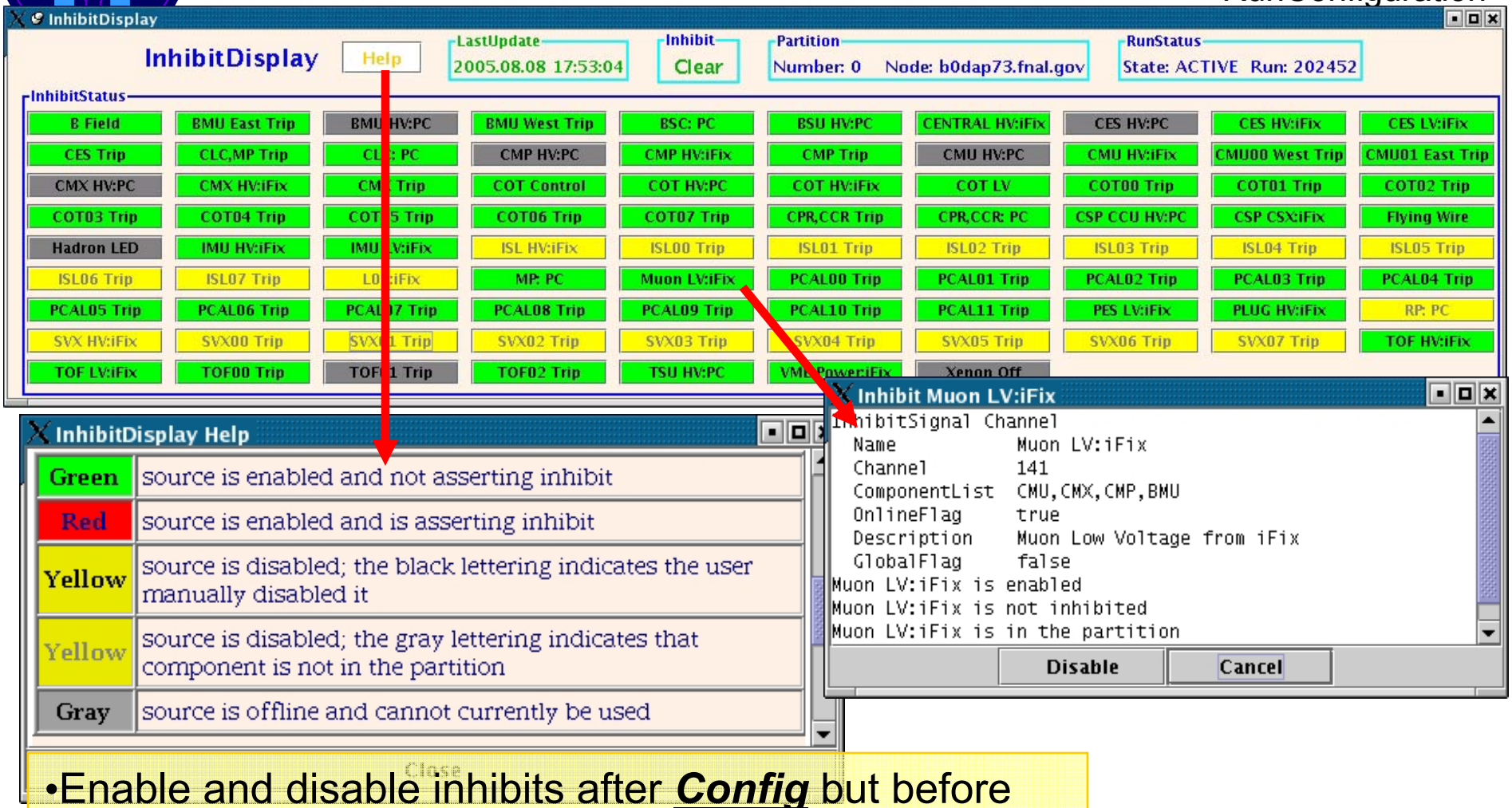

- Enable and disable inhibits after ***Config*** but before ***Activate*** transition, while in the ***Ready*** state

RunControl crate: **INHIBITS_00** *b0inh00*

DataType Selection

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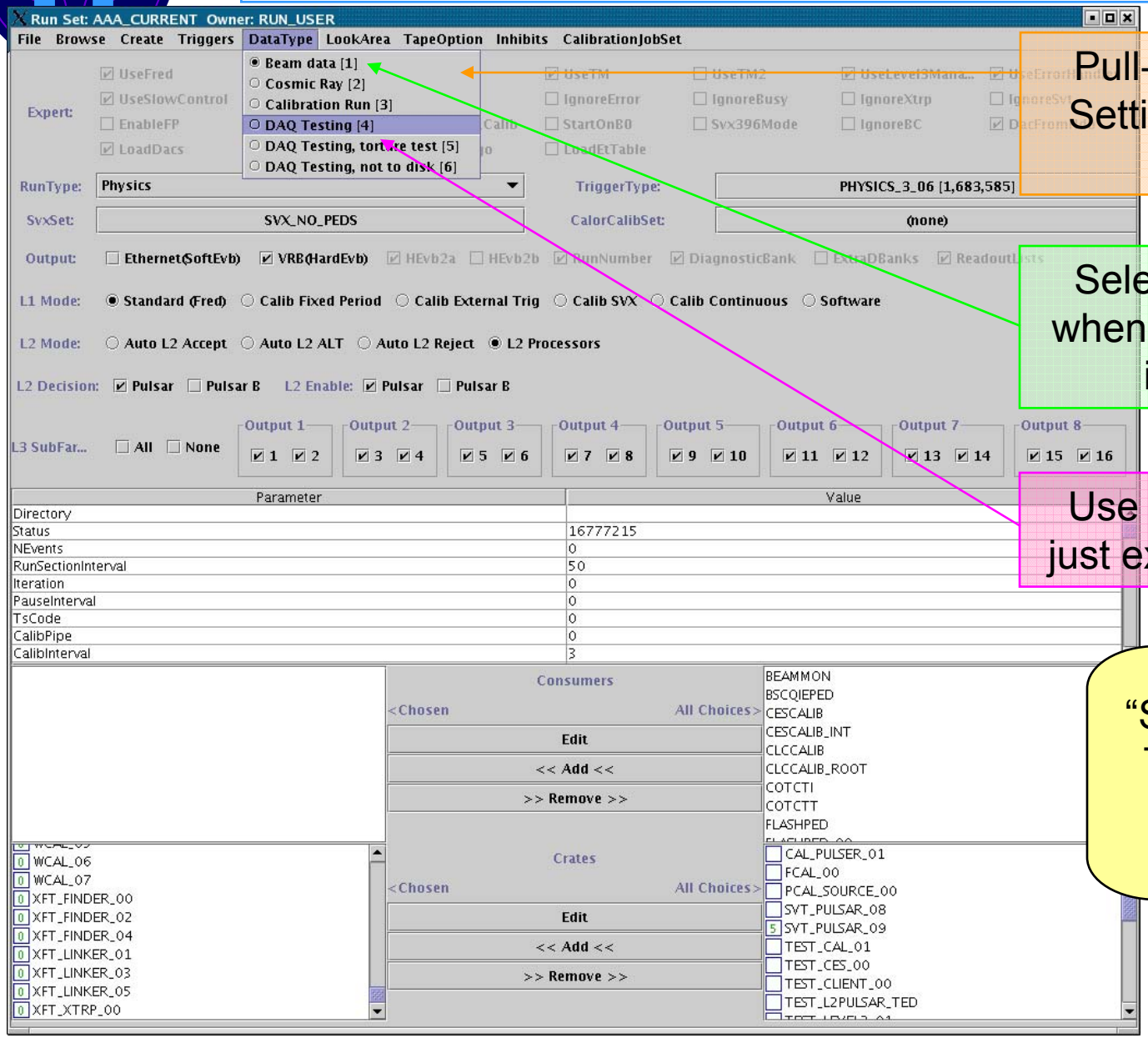

Pull-down menu in Run Settings window selects data types

Select *Beam Data* only when colliding beams are in the Tevatron

Use DAQ Testing when just exercising the system

Tony sez:
"Selecting the Data Type is the Ace's most important Duty"

Data Storage Control

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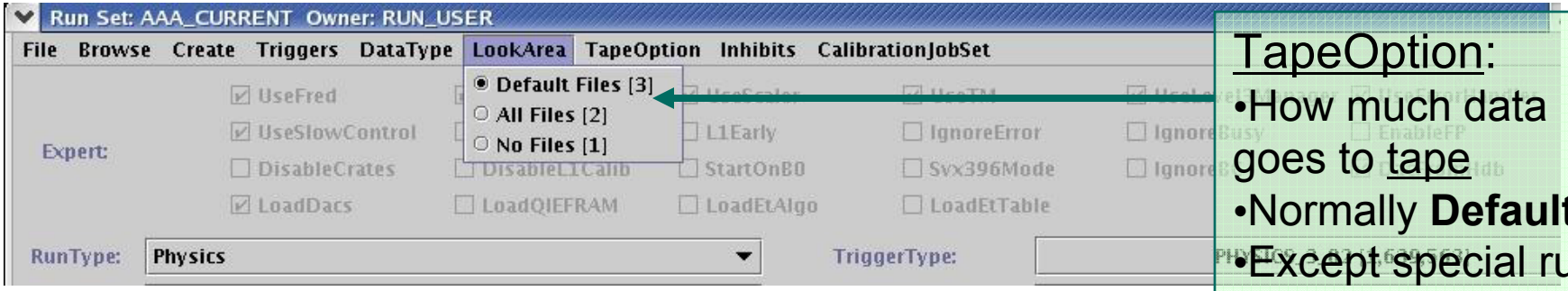
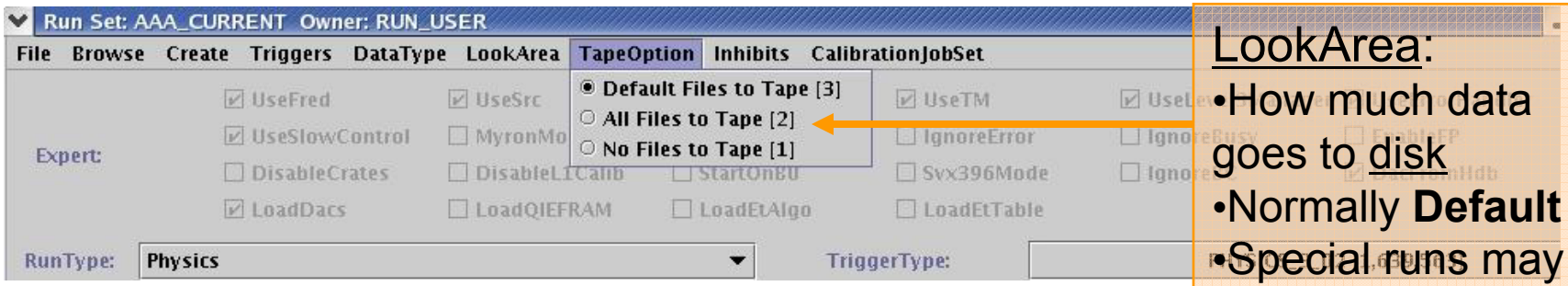


TapeOption:
- How much data goes to tape
- Normally **Default**
- Except special runs request



LookArea:
- How much data goes to disk
- Normally **Default**
- Special runs may have different setting

You have two ways to control the final storage disposition of the data, via *disk* or *tape*
Use non-defaults only on expert request

TriggerType Selection

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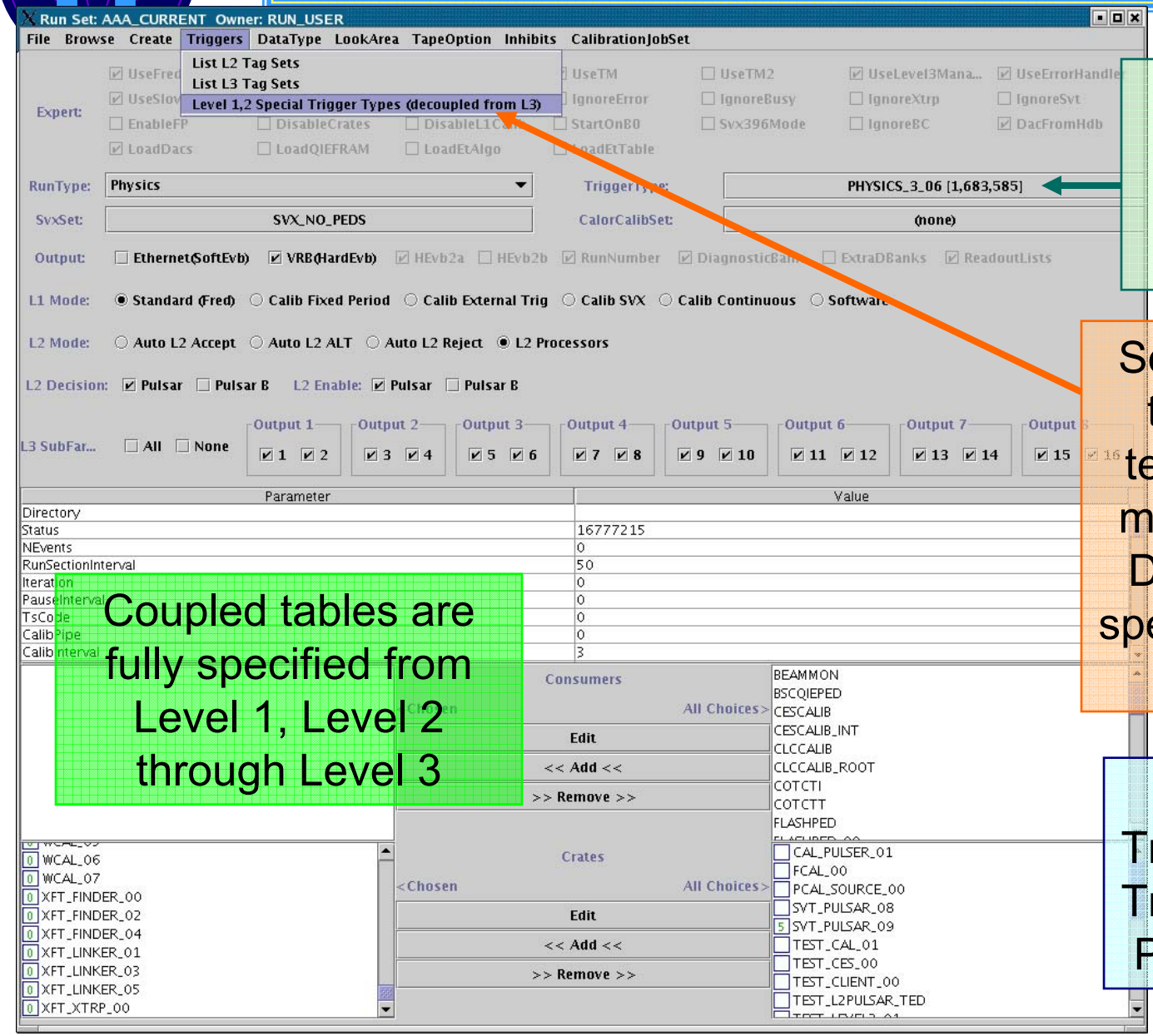

Select *coupled* TriggerTable here for normal physics running

Select decoupled tables here for testing, cosmics, minbias, l2torture Decoupled table specify only L1 and L2

Coupled tables are fully specified from Level 1, Level 2 through Level 3

Synonyms: TriggerType = TriggerTable = PhysicsTable

Coupled Trigger Tables

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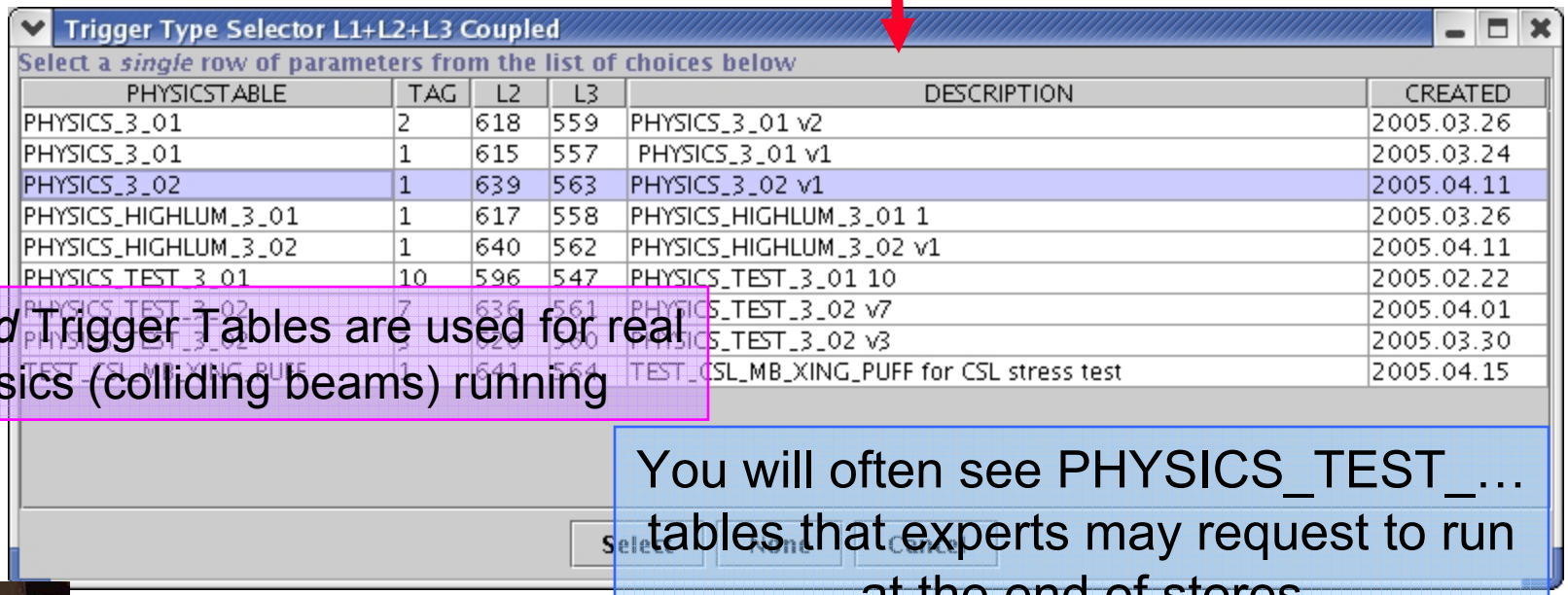
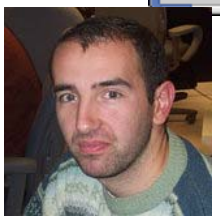
Your Ops Manager will tell you which one to use and which are for special test runs (see white board)

Click here for coupled physics tables



Coupled Trigger Tables are used for real physics (colliding beams) running

You will often see PHYSICS_TEST_… tables that experts may request to run at the end of stores



Guillelmo sez:
"Selecting a TriggerTable that does not crash Level 3 is the Ace's most important duty!"

Decoupled Trigger Tables

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-2005

Run Set: AAA_CURRENT Owner: RUN_USER

File Browse Create Triggers DataType LookArea TapeOption Inhibits CalibrationJobSet

List L2 Tag Sets
List L3 Tag Sets
Level 1,2 Special Trigger Types (decoupled from L3)

Click here for decoupled trigger tables

Expert:

UseTM UseLevel3Manager UseErrorHandler
IgnoreError IgnoreBusy EnableFP
Svx396Mode IgnoreBC DacFromHdb
DisableCrates DisableL1Calib StartOnBO
LoadDacs LoadQIEFRAM

RunType: Physics
TriggerType: PHYSICS_3_02 [1,639,563]
SvxSet: SVX_NO_PEDS
CalorCalibSet: (none)

Trigger Type Selector L1+L2...L3 Decoupled

Select a row of parameters from *each* of the two lists below

PHYSICSTABLE	TAG	L2	CREATED
COSMICS	15	619	2005.02.22
COSMICS	14	503	2004.06.30
COSMICS_3TRACK	1	540	2004.11.03
COSMICS_NOTRACKS	9	620	2004.05.04
COSMICS_NOTRACKS	9	467	2004.05.04
COSMICS_VADIM	2	537	2004.10.20
COSMICS_VADIM_3TRACK	1	542	2004.11.04
L2_TORTURE	16	623	2004.05.04
L2_TORTURE	16	595	2004.05.04
L2_TORTURE	16	565	2004.05.04

L3	DESCRIPTION	CREATED
549	RECO_51 with Pulsar patches	2005.02.24
548	ALL_RECO with Pulsar patches	2005.02.24
540	NULL Table v3 5.1.3_level3c	2005.02.08
539	L3_RECO_51_PS5 v1 Rebuilt with Aseet/Mirceas patc...	2005.02.08
538	L3_PASS_ALL_RECO_51_v1 Rebuilt with Aseet/Mirceas...	2005.02.07

Select

None is a valid option when using the calibration trigger

Lots of *decoupled* trigger table options,due to combinatorics of unspecified Level 3 paths

Greg Sez: "Selecting the correct Trigger Table that doesn't break Fred is the Ace's most important duty!" (plus bringing Greg Krispy Kreme doughnuts to make him very, very fat)

CrateEditor

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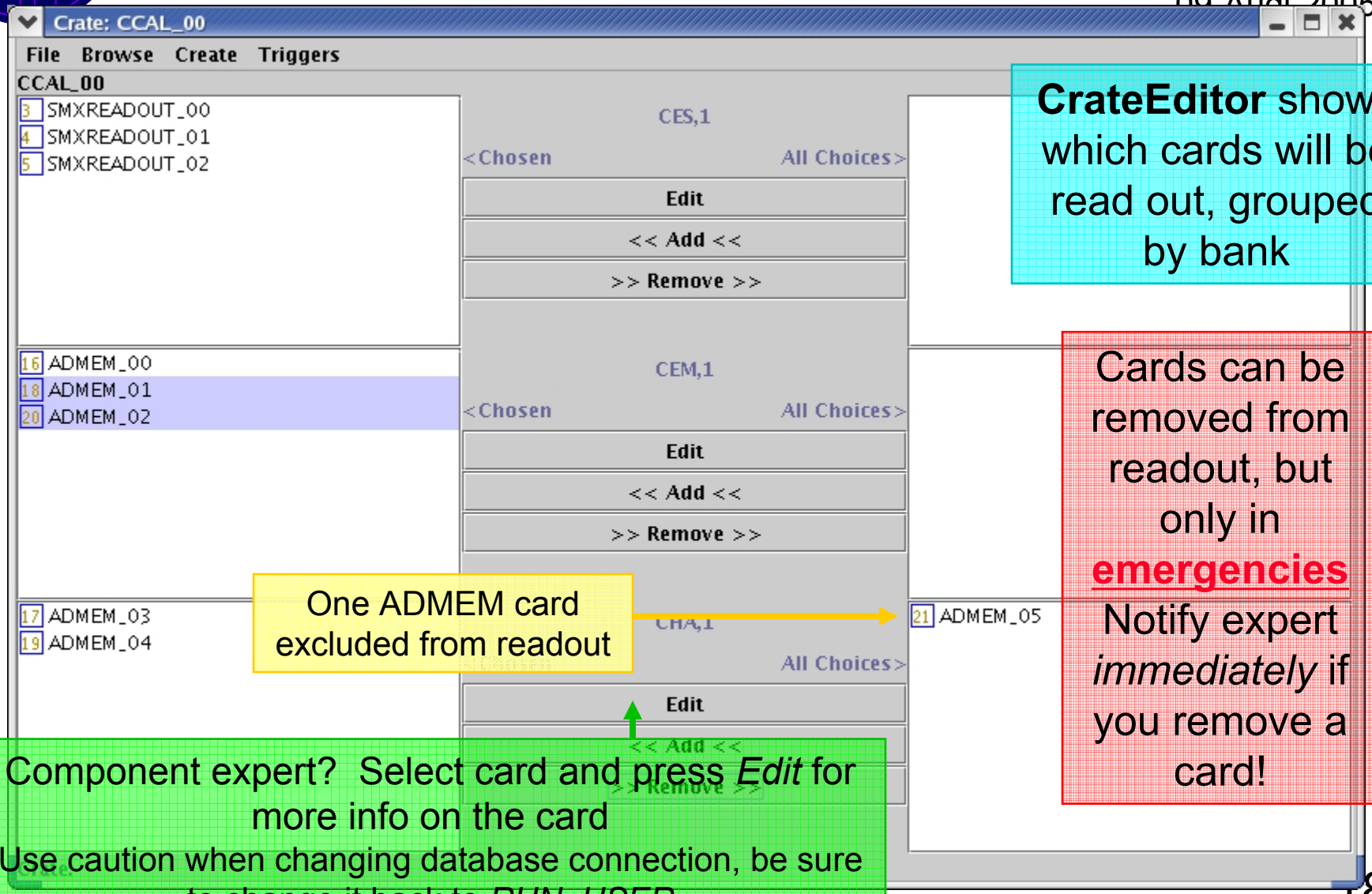

CrateEditor shows which cards will be read out, grouped by bank

Cards can be removed from readout, but only in **emergencies**
Notify expert *immediately* if you remove a card!

One ADMEM card excluded from readout

Component expert? Select card and press *Edit* for more info on the card
Use caution when changing database connection, be sure to change it back to *RUN_USER*

Proxy Control Menu

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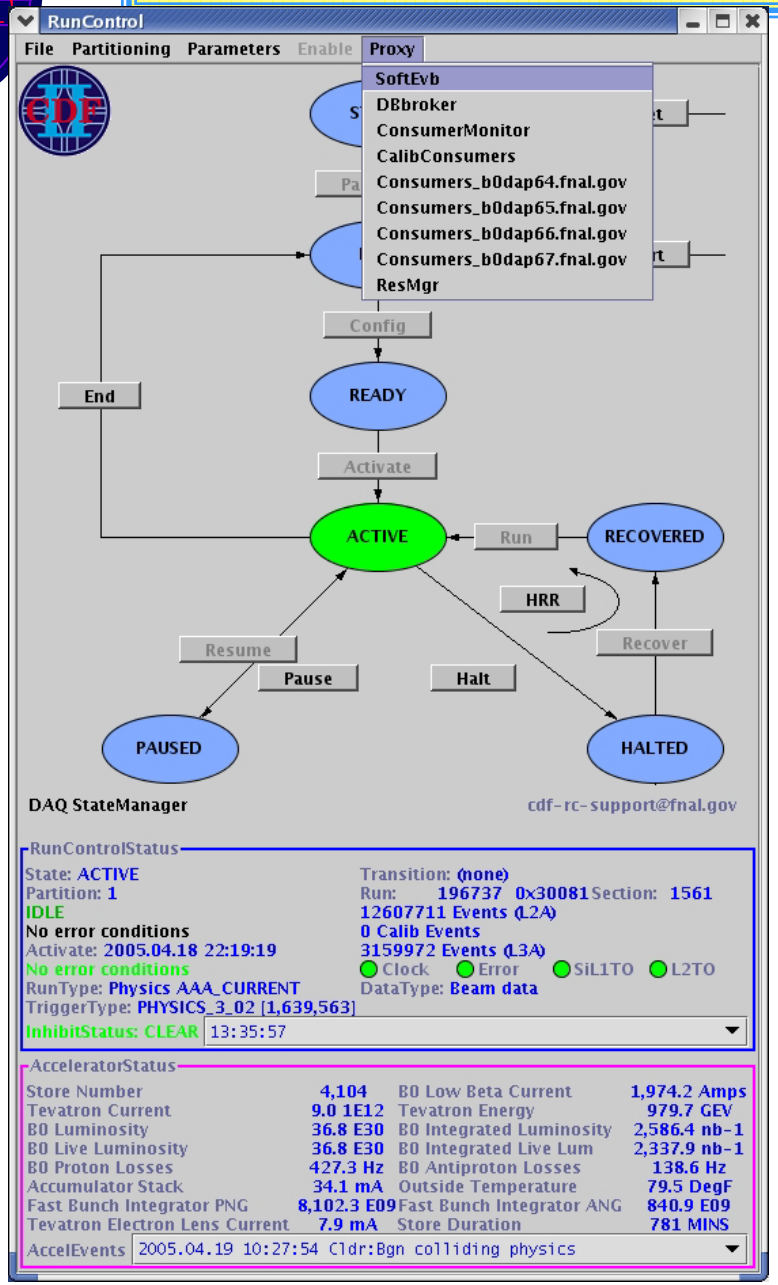

The Proxy gives you control over remote data acquisition processes:

- Software Event Builder
- Database Broker (for SVX)
- Consumer Monitor
- Calibration Consumers
- Resource Manager
- Physics Consumers (to be implemented)

SoftEvb Proxy Viewer

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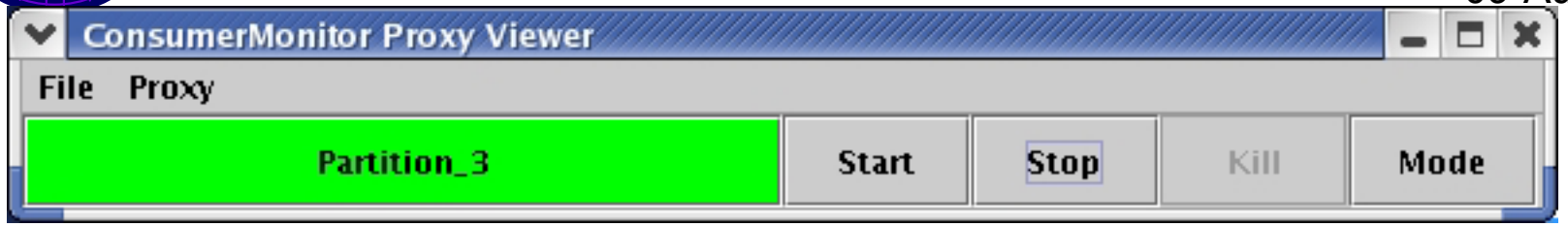

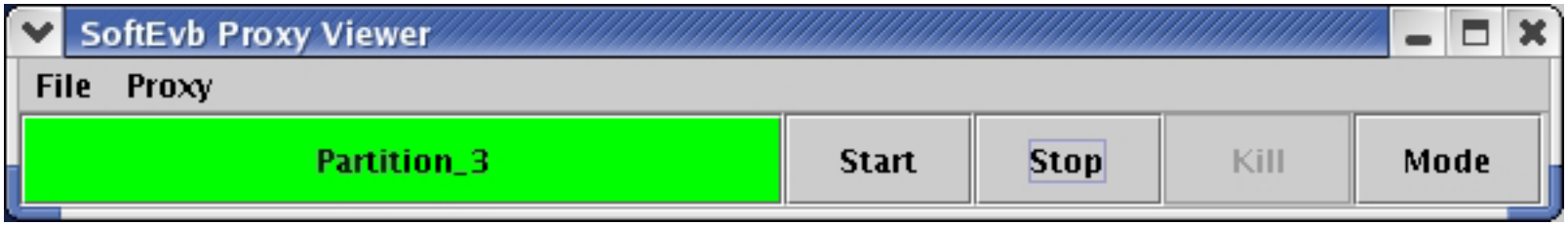

If you don't get responses from the Software Event Builder during transitions, then check the SoftEvb Proxy, and stop and/or restart if needed

Status colors:
- Green: Up and running
- Cyan: not running

Click on main button for detailed information

CalibConsumer Proxy

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Use the Calibration Consumer Proxy to see if your calibration consumer is still running

ResourceManager Proxy

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Having a problem with *Sticky Partitions*?
Try restarting the ResMgr_Prd
You can't hurt anything!

State Manager Selection

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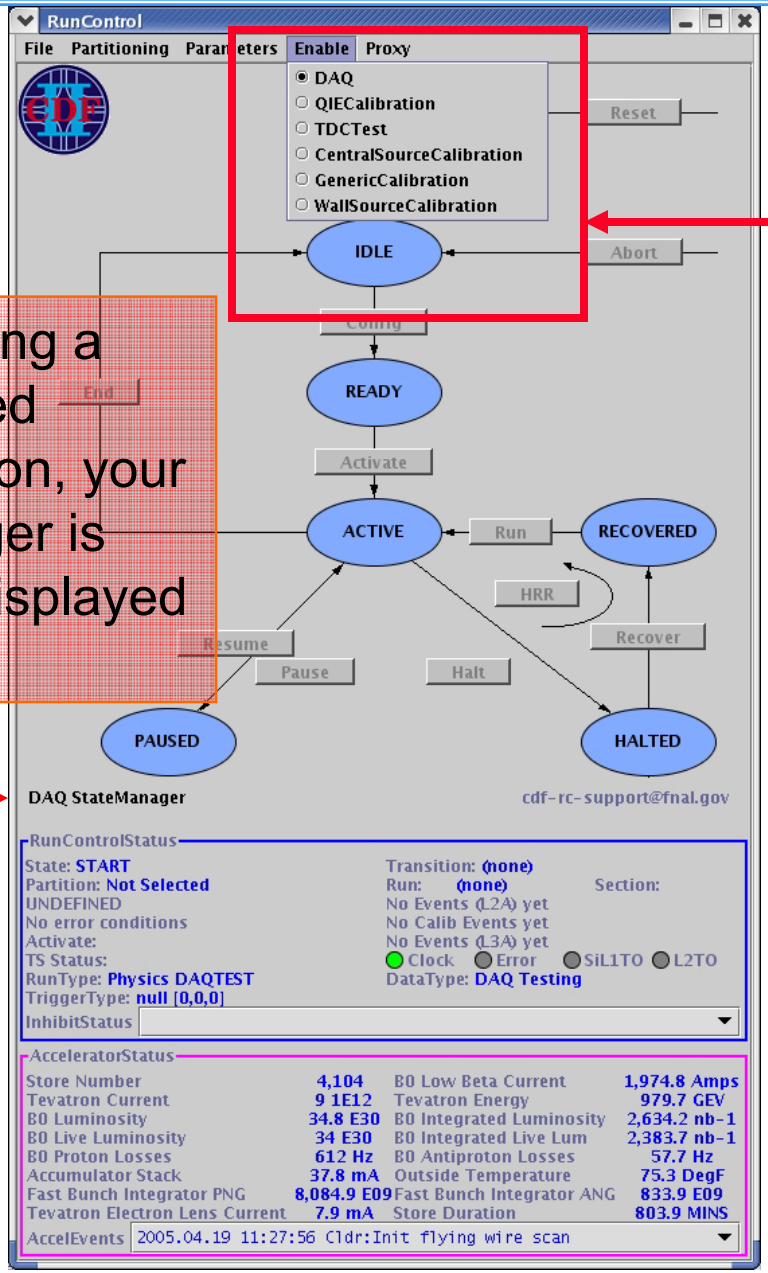

Select State Manager:

- Usually **DAQ**, default on startup
- **GenericCalibration** for calibrations unless specific menu item for given run type: e.g., **QIE Calibration**
- Source and TDC testing are primarily for experts

After selecting a predefined RunConfiguration, your StateManager is automatically displayed *(new!)*

StateManager name

The State Manager determines the flow of control when cycling through runs

Transition Sequencing

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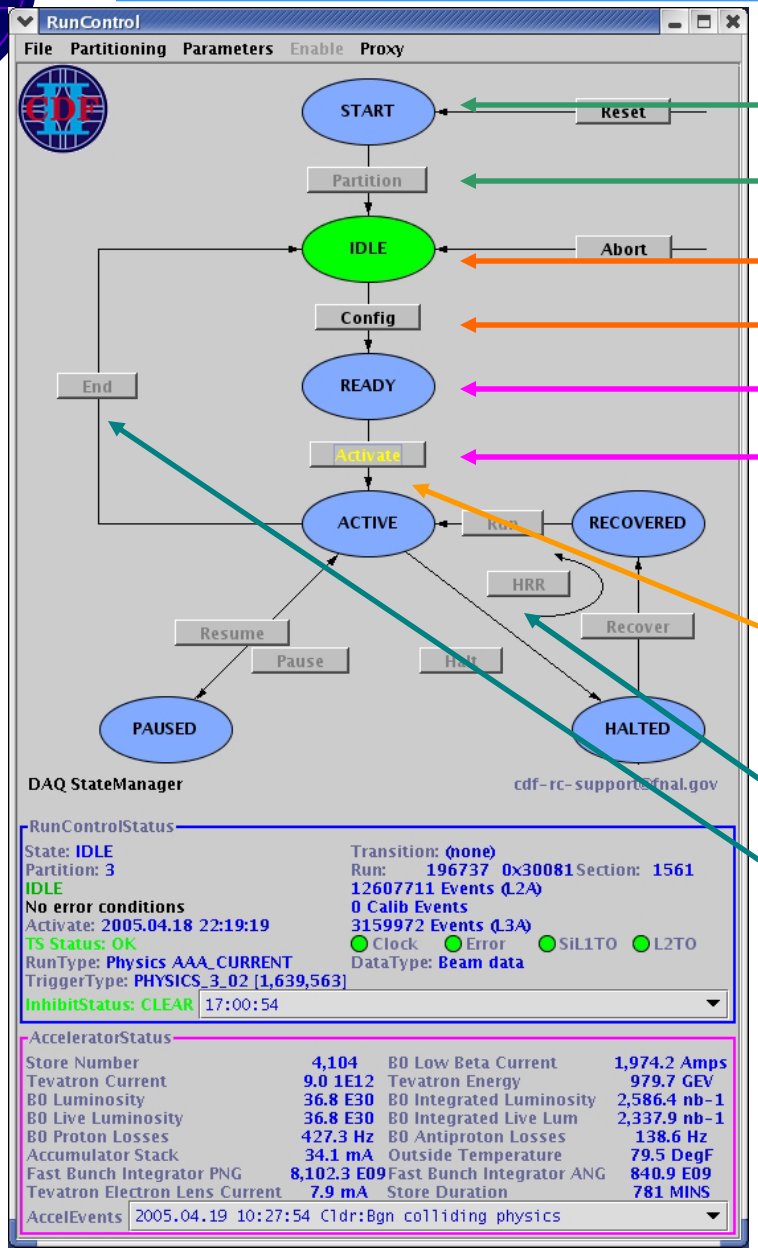

At ***Start*** state, select all desired clients and *Partition*

At ***Idle*** state, configuration must be fixed, then *Config*

At ***Ready*** state just about prepared to take data, then *Activate*

Note use of *click-ahead* (shift key plus mouse click) so that Activate will automagically engage when it becomes available

To fix problems, try ***Halt*** ***Recover*** ***Run***
When *Active* and ready to finish run, ***End***

Abort and ***Reset*** always available to get you out of sticky situations
Use sparingly!

Transitions

- **Partition**: Select front end crates and clients for the run; configure trigger and return crosspoints
- **Config**/**Setup**: Configure crates and clients with info that could change run by run, without adding or subtracting RC clients (slowest transition)
- **Activate**: Final step to enable system to take data (fast)
- **End**: Normal end of run, produces end of run summaries
- **Abort**: Return to Idle when no other option available
- **Pause**/**Resume**: Briefly stop data taking (HV trips, flying wires, inhibits)
- **Halt**/**Recover**/**Run**: Fast system error recovery, first option to use when an error occurs during data taking
- **Reset**: Return to Start state from Idle, or when no other options are available

Calibration State Managers

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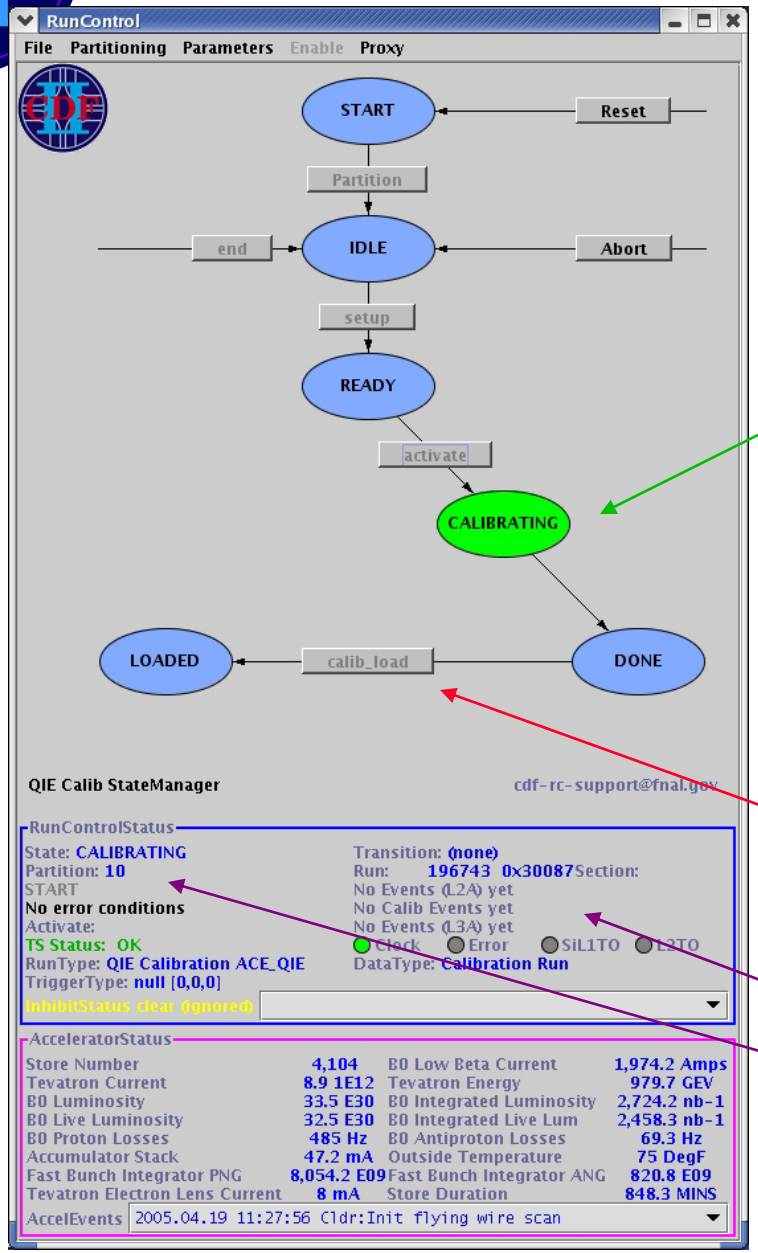

QIE Calibration State Manager

Calibrating: Transitory "fall-through" state, will drop to *Done* when all front end crates are complete

Know where Calibration Consumer log files are kept:
~cdfdaq/consumers/log

CalibLoad special option to do full download of AdMem FRAMs, by expert request only

QIE Calibration may be done in software partition, no hardware triggers are generated

RunControl in action

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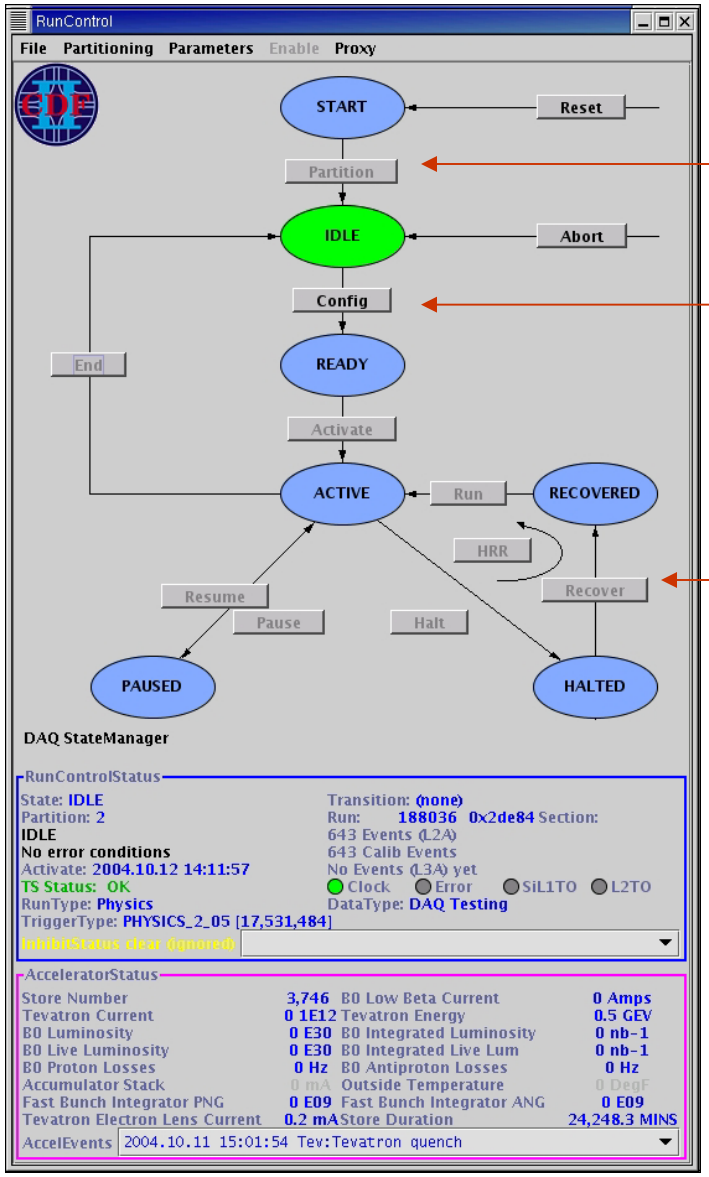

Partition: choose front end crates and other virtual clients to participate in the run

Config: configure hardware and software for desired run typeh

HaltRecoverRun: quickly reset the entire DAQ and trigger system for fast recovery, minimize dead time; Normally use express HRR button

StateManager
- User initiates *transitions* between different *states*
- Goal is to stay in the *Active* state until run is complete, taking recovery actions as necessary

Sample Transition Errors

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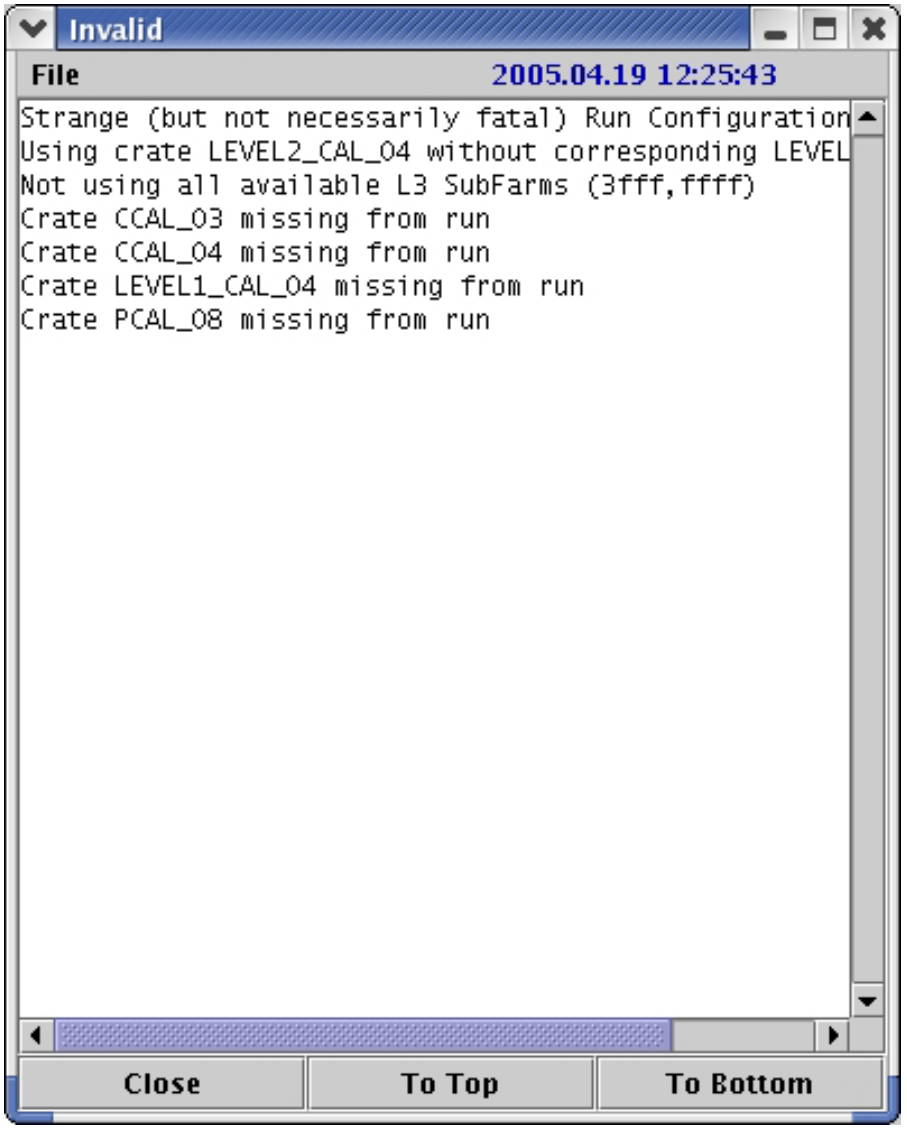
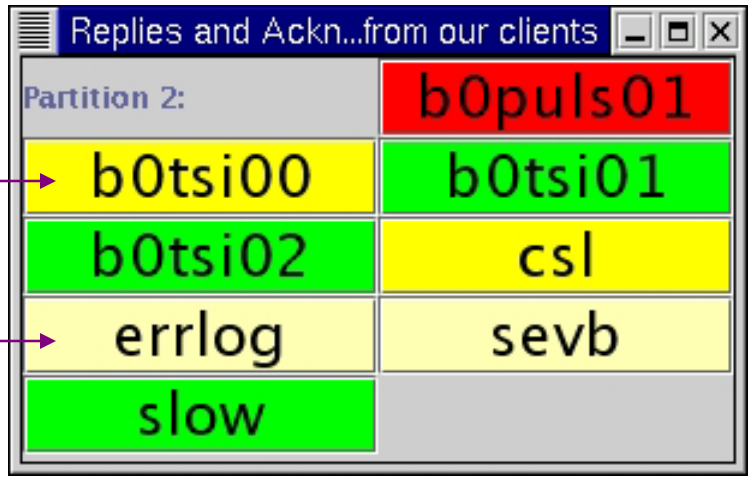


During your Run Control session, you will sometimes see warning messages pop up. This example tells you are missing some important crates during a beam physics run

Do ***NOT*** ignore any of these messages!!!

If you do not understand a message, contact the appropriate expert immediately

Reply & Acknowledgments Window



- Which clients have not yet been sent a transition?
- Which clients have received a transition message, but have not yet responded to the transition?
- Which clients have responded successfully to the transition?
- Which client is in error?

This window indicates the transition status of clients:

- **Butter yellow**: RC has *not* sent transition yet
- **Margarine yellow**: RC has sent transition, *waiting* for acknowledgment
- **Green** Client sent successful acknowledgment
- **Red** Client reported an error during transition – check error log

Click on the client button for more info and the client's ***LocalClientController***

Learn the Colors!

LocalClientController

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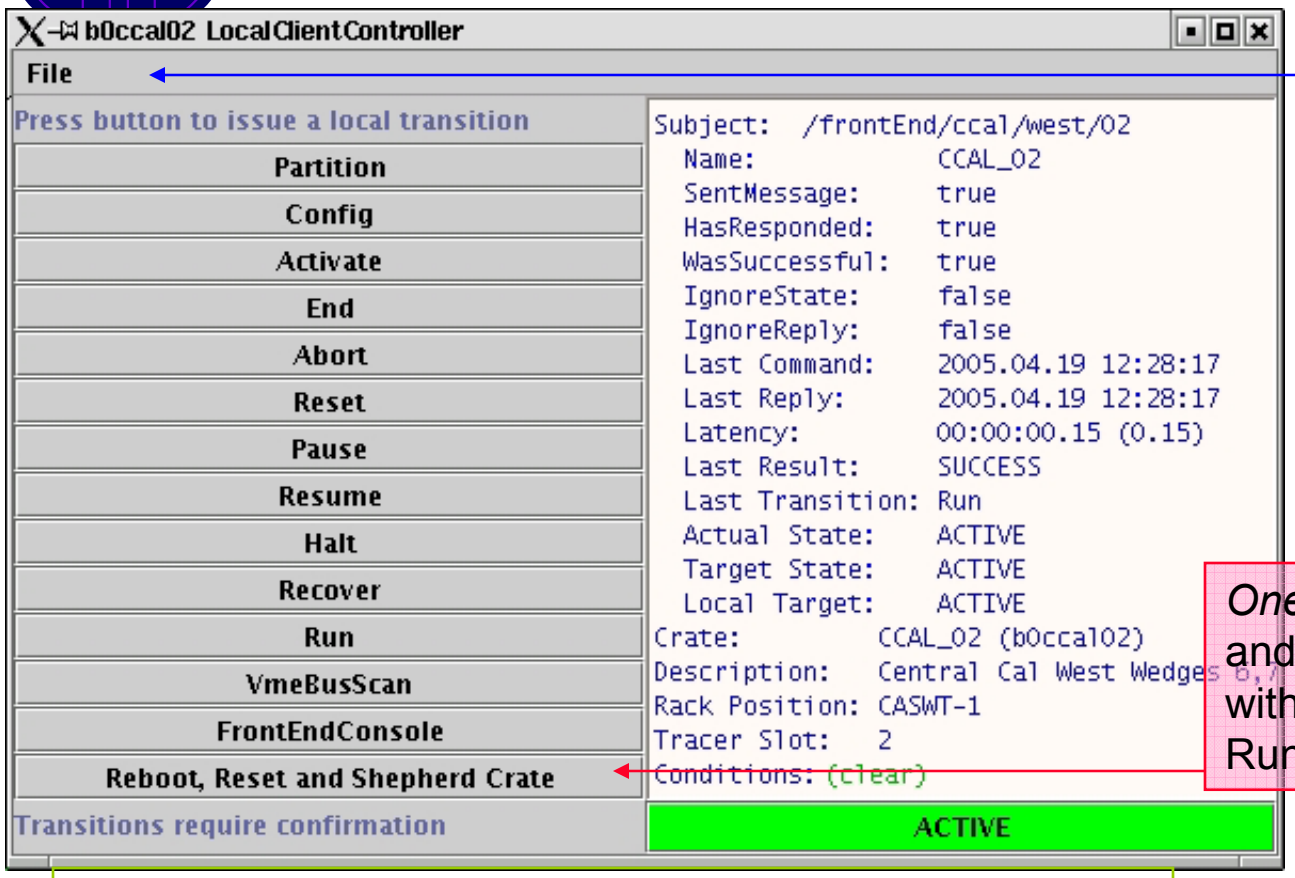

File menu gives you access to the contents of the configuration messages sent to the client

You can send single transitions to a single crate by hand here

One-Touch shepherding: reset and bring crate back into line with other Run Control clients

Allows you to **shepherd** individual clients through the transitions
Can be used if one client out of many fails a transition
Be careful to retain the same configuration!!

Avi sez: "We need a mouse-click database!"

VmeBusScan Button

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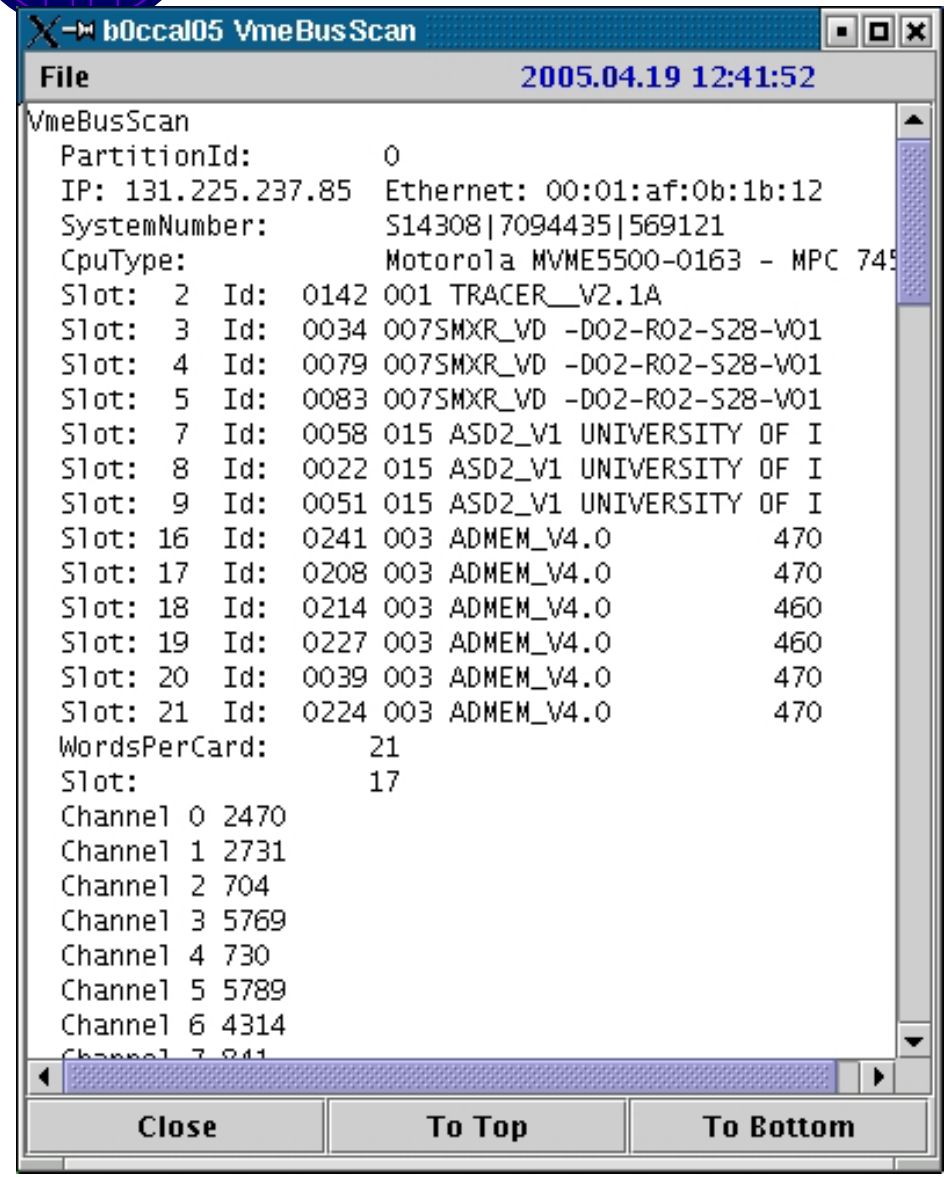

Choosing VmeBusScan from the Local Controller window returns a scan of all cards in the front end crate

Useful for verifying the presence and basic functionality of readout cards

FrontEnd Crates Control i/o

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Ethernet port:
- vxlogin
- RunControl transitions
- Status messages
- Software Event Builder

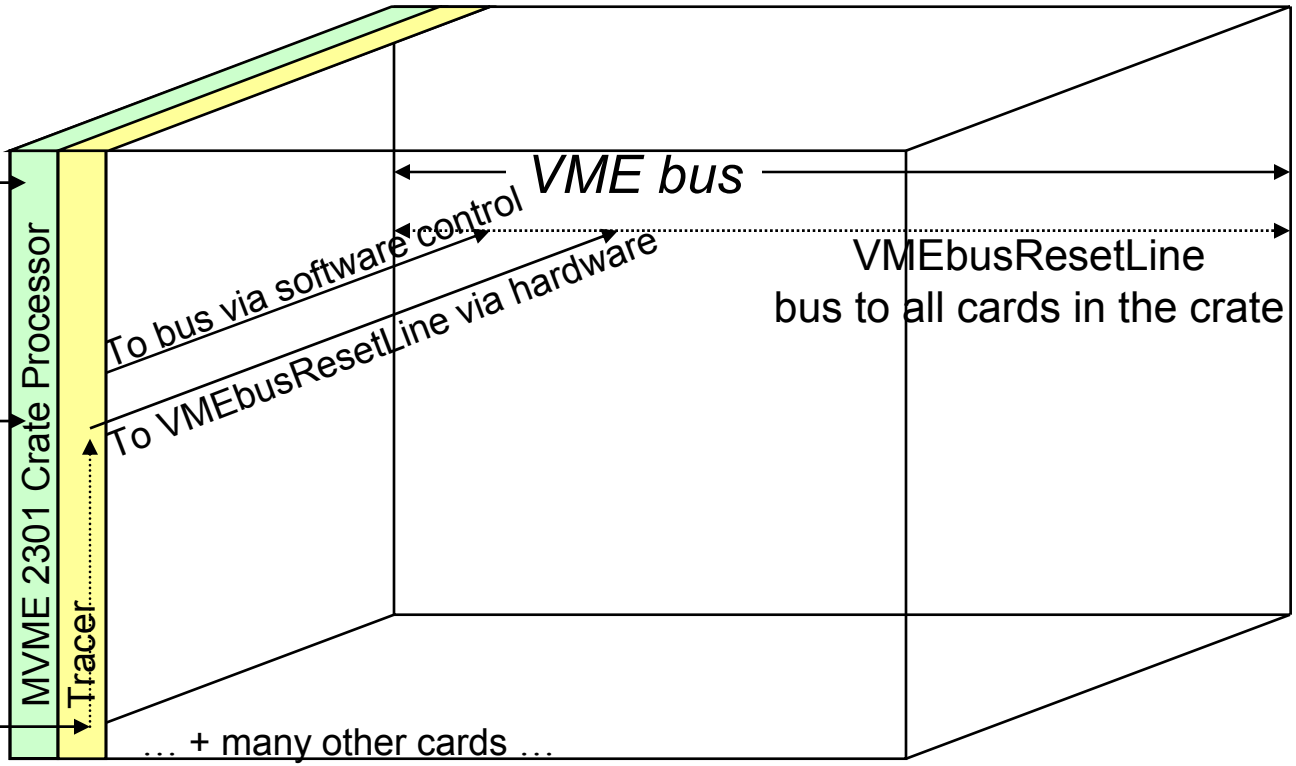
TCP/IP 100 Mb/s

Serial port:
- minicom* on *b0dap10*
- FrontEndConsole from RunControl LocalClientController

serial line 9600 baud

Reset line:
- reset_crate
- Reboot, Reset, Shepherd… from RunControl LocalClientController
- originates at *b0res00* and *b0res01* crate

unidirectional pulse



From three into many…

* To be replaced with *vxcom* command available from any node

The Five Fold Reset Path

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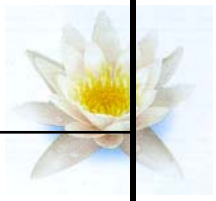
Command	CPU Reset	VME Crate Reset
Reboot, Reset and Recover Crate From the RunControl LocalClientController; uses reset line and software (VISIONdemo)	*yes*	*yes*
reset_crate After *setup fer* from unix shell; proceeds via reset line to tracer and then on to VME bus	*yes*	*yes*
VISIONdemo, 9, 10 After *setup fer* from unix shell, or after logging into crate with vxlogin or minicom; proceeds via software on to the VME bus; TDCs may prefer this	*yes*	*yes*
vxboot After *setup fer* from unix shell; logs into crate processor and reboots via software	*yes*	no
reboot After logging into crate with vxlogin or minicom, equivalent to vxboot	*yes*	no



CPU *vs.* Crate Reset

- CPU Reset
  - Clears up any software problems or heap corruption
  - Nicer to SmartSockets rtserver
  - Does not touch any other card in the crate
- VME Bus Crate-wide Reset
  - Also reboots CPU
  - Resets all cards in the crate via the VME bus reset line
  - Often needed by readout cards, e.g. TDCs are a popular candidate to benefit from VME bus reset
  - May leave dangling connection to SmartSockets *rtserver*
- For persistent hardware problems, neither reset may be successful
  - Important to contact appropriate expert as soon as possible in this case, there may be a serious hardware malfunction
  - Expert may indicate that a power cycle is needed – do only under the advice of an expert

LocalClientController Details

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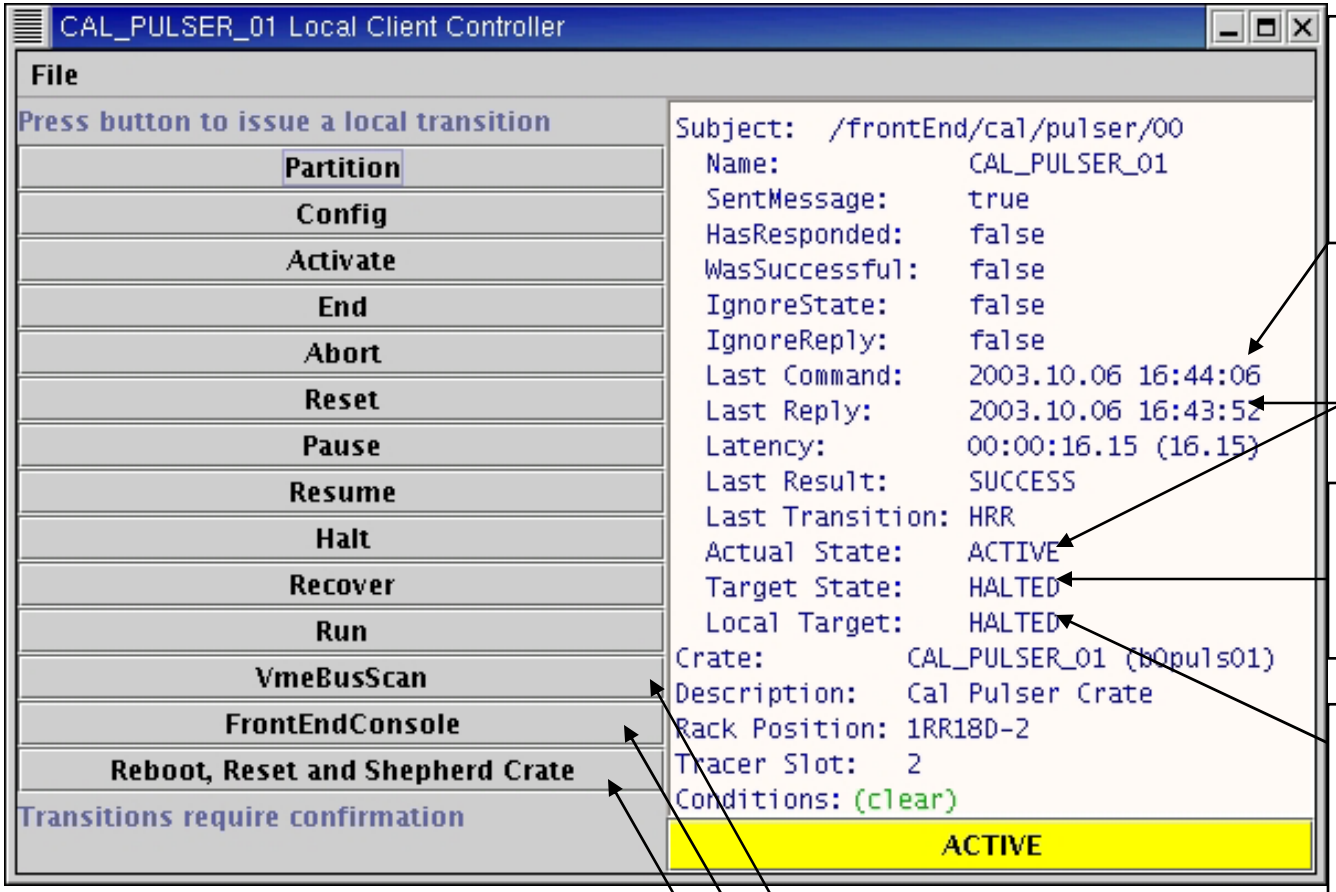


Last transition command time, from main RunControl or this indvidual controller

Last known state as issued from client, with time

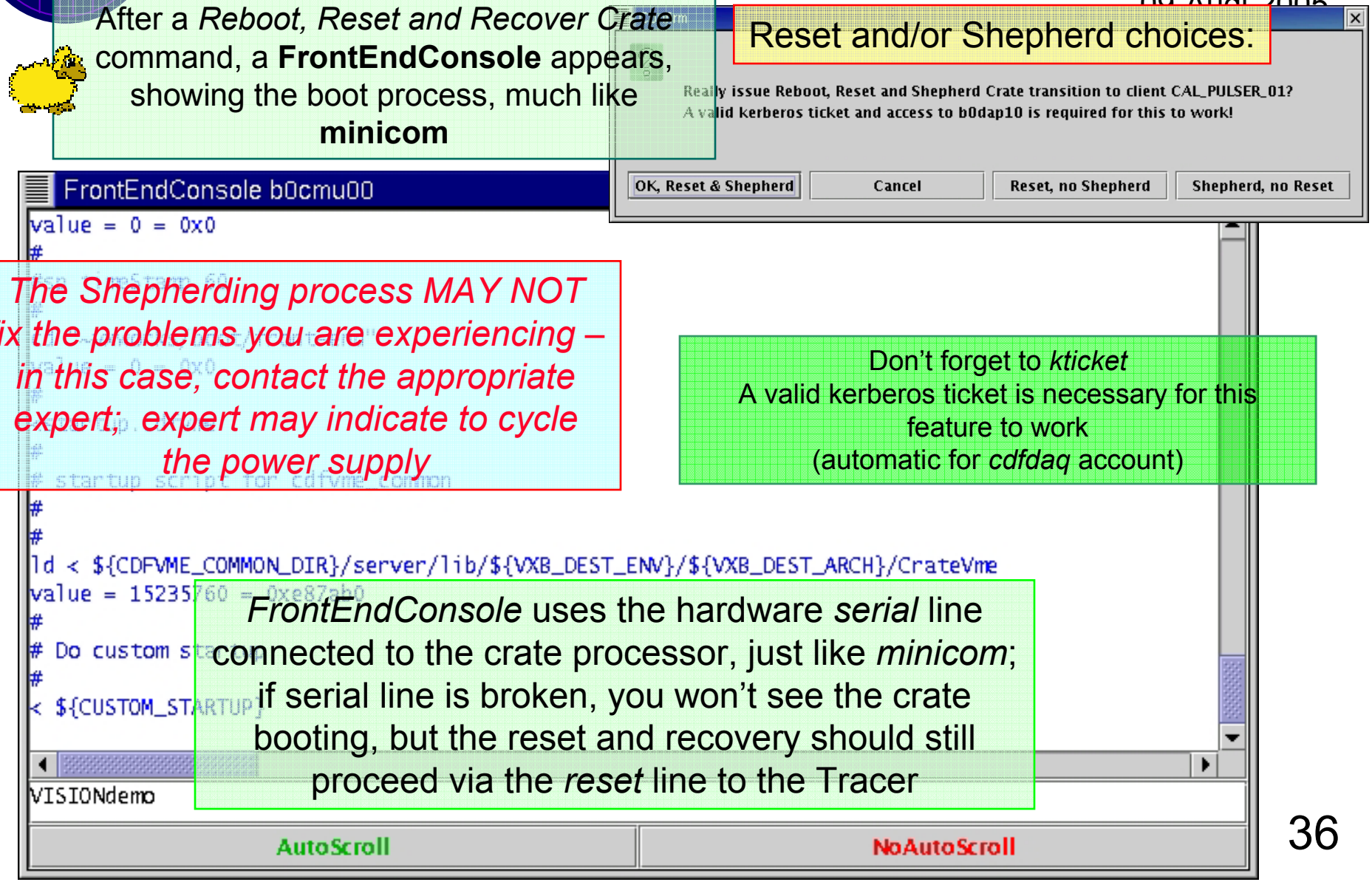
Target state to match the global expected state from main RunControl

Local target state to match the last local transition issued from this individual controller

Presence of these buttons while *Active* indicates a VME crate which can be recovered in the middle of a run

FrontEndConsole

After a *Reboot, Reset and Recover Crate* command, a **FrontEndConsole** appears, showing the boot process, much like **minicom**



The Shepherding process MAY NOT fix the problems you are experiencing – in this case, contact the appropriate expert; expert may indicate to cycle the power supply

Don't forget to *kticket*
A valid kerberos ticket is necessary for this feature to work
(automatic for *cdfdaq* account)

FrontEndConsole uses the hardware *serial* line connected to the crate processor, just like *minicom*; if serial line is broken, you won't see the crate booting, but the reset and recovery should still proceed via the *reset* line to the Tracer

Special Needs Clients

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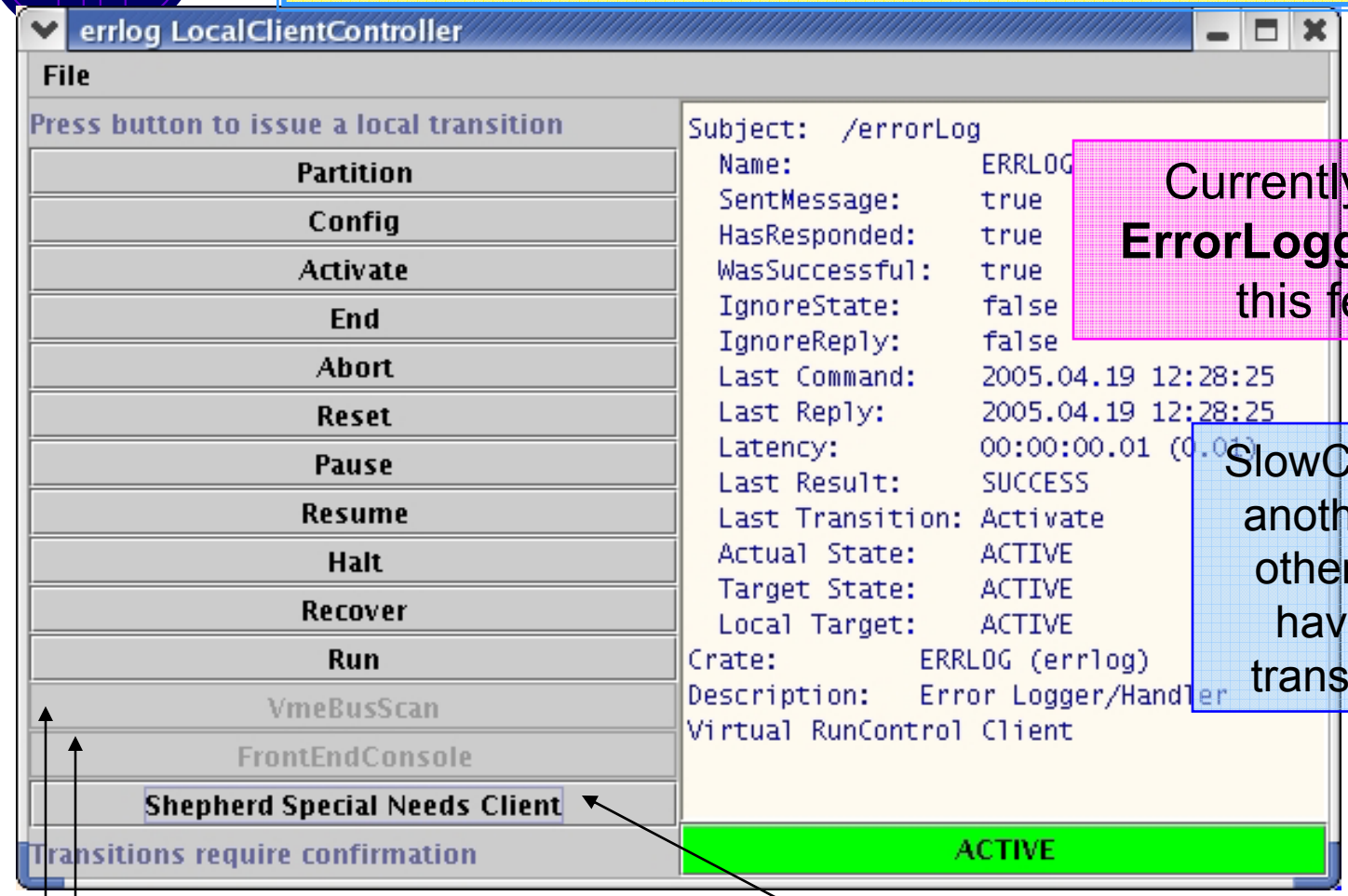

Currently only the **ErrorLogger** can use this feature

SlowControl may be another customer; other clients may have individual transitions issued

Disabled buttons indicate this is not a VME crate

Special Needs Virtual RunControl clients **must be restarted** per their special instructions before shepherding

ClientMonitor

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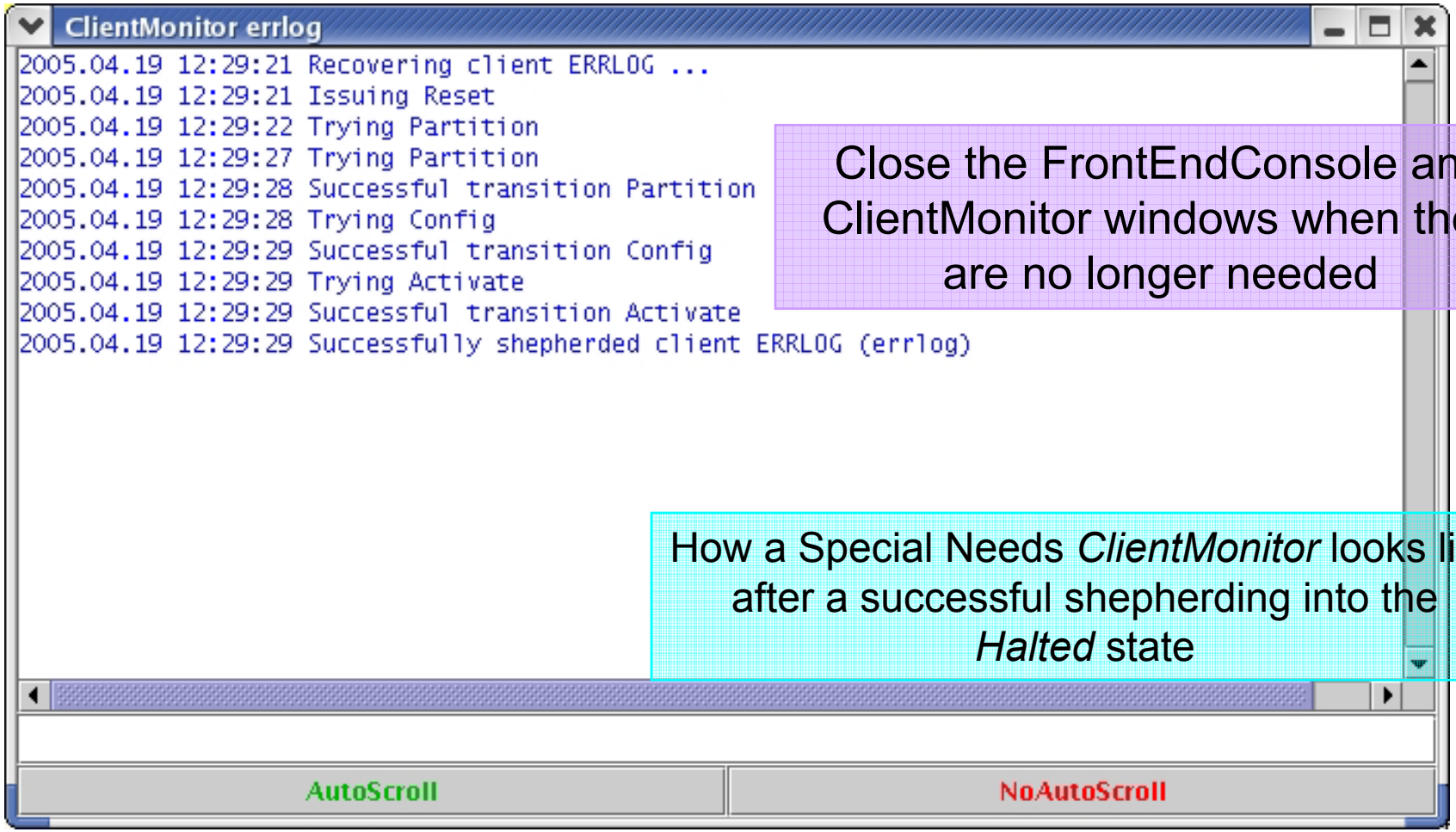
After issuing Recover Special Needs Client, a special logging window *ClientMonitor* will appear in lieu of a *FrontEndConsle*



Close the FrontEndConsole and ClientMonitor windows when they are no longer needed

How a Special Needs *ClientMonitor* looks like after a successful shepherding into the *Halted* state

Shepherding Status

- Some clients and crates should never be recovered in the middle of a run
  - http://www-cdfonline.fnal.gov/ace2help/runControl/shepherding.html
  - L1, L2, L3, HEVB, SEVB, CLC, CSL, Scalers (b0tsi03)
  - Function will be disabled in *LocalClientController* window
- Some front-end crates have reset line or serial line broken
  - All crates in collision hall working (check this!)
  - JDL promises to fix remaining (upstairs) crates someday
  - As long as reset line *or* serial line works, shepherding will work
    - although you may see warnings
    - no crate has both reset and serial lines broken

End of Run Status Box

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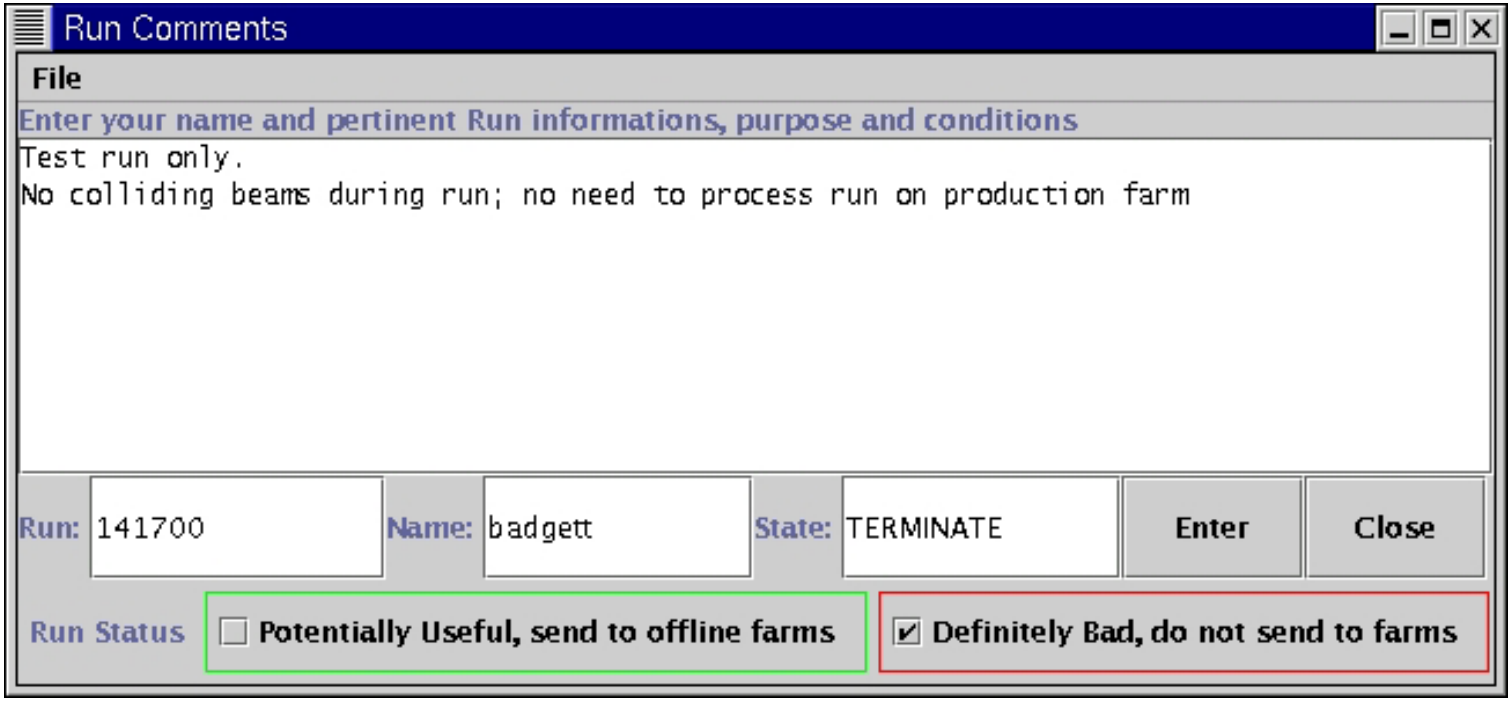

At the end of a run you will be presented with a comment box: enter any pertinent run informations

At the end of a beam physics run, you must also decide the basic run quality. When in doubt, choose *Potentially Good*

Determines whether run is processed offline!

Error Logger

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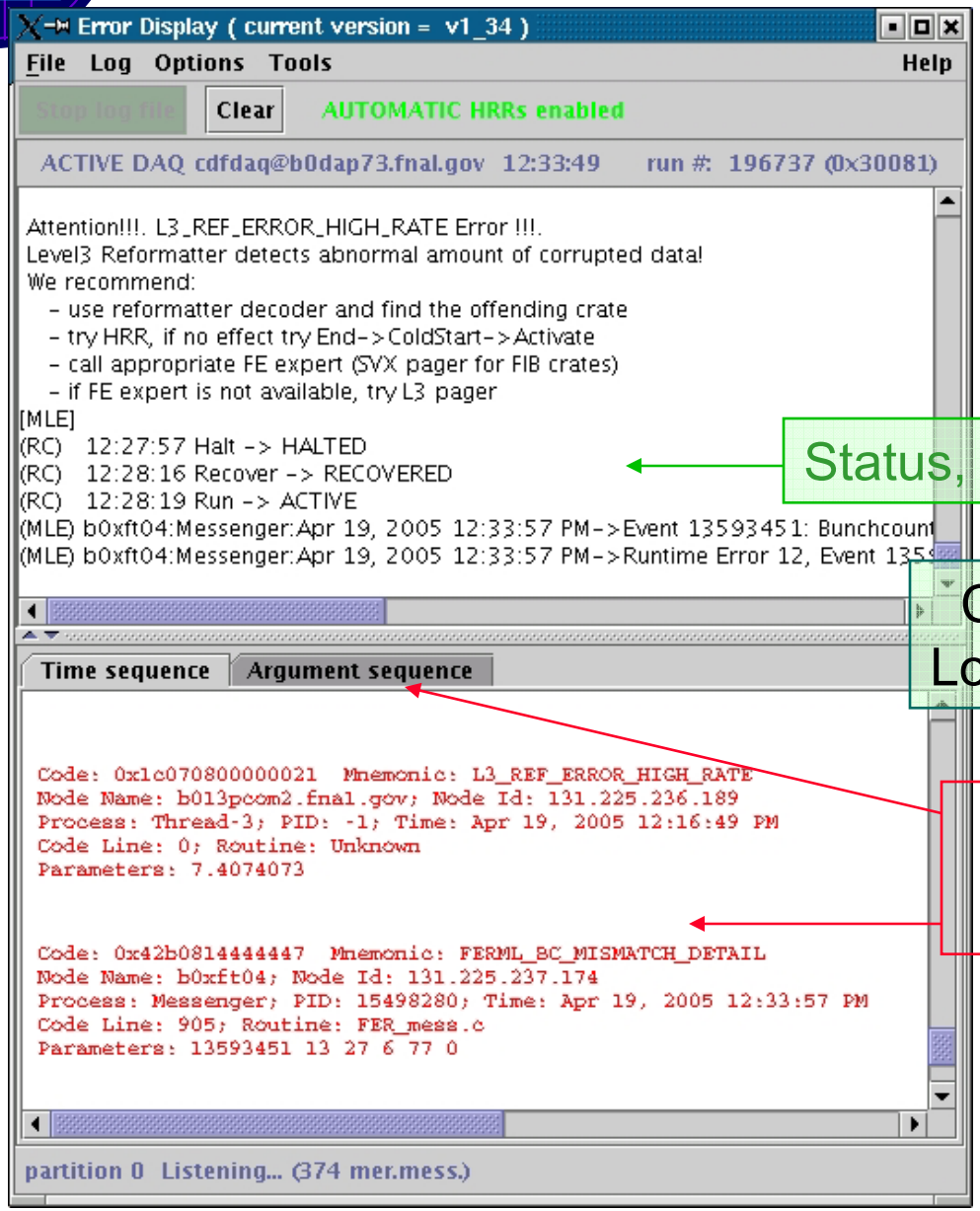

Error Logger receives and interprets status and error messages from front end crates and other clients

Status, Warning and Error Messages

Client errors on Run Control? Look here for more informations

Error Messages, with summary pane

Error Logger Control Options

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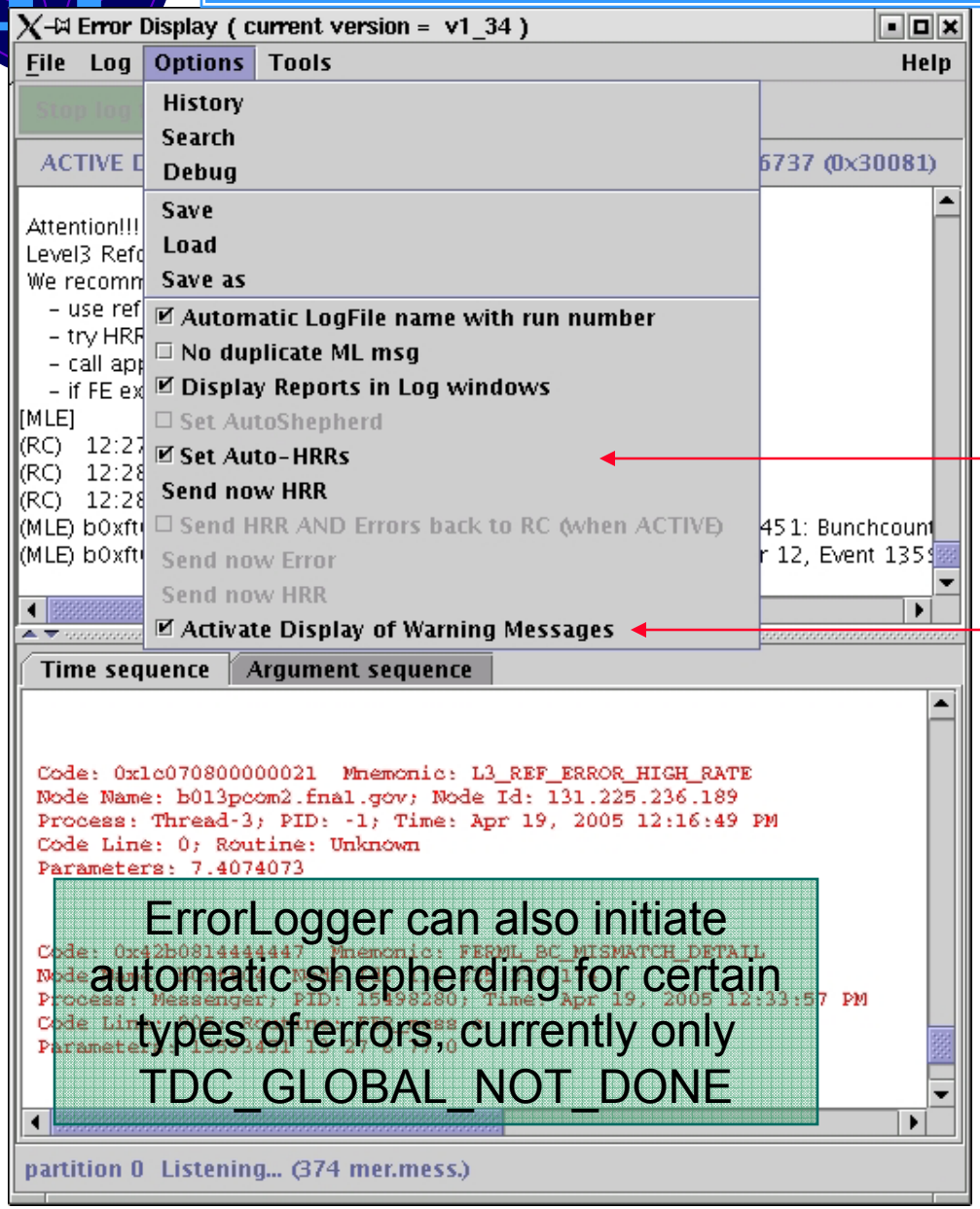

ErrorLogger can send transition commands to Run Control when specific problems are encountered

Enable automatic HRR here, should normally be on

Enable warning messages here, should normally be on

ErrorLogger sends orange and red warning windows to Run Control, often with special instructions on how to recover

ErrorLogger can also initiate automatic shepherding for certain types of errors, currently only TDC_GLOBAL_NOT_DONE

DaqMon

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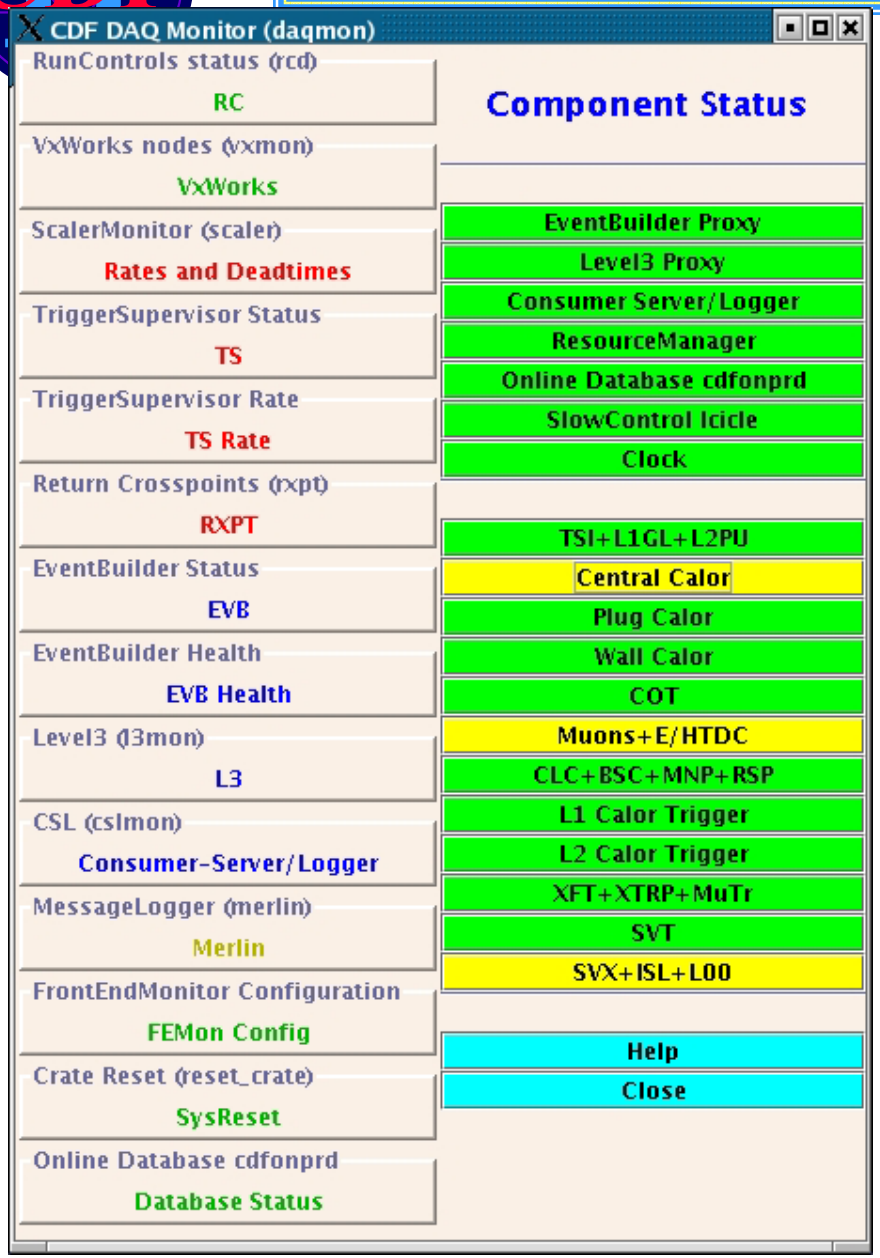

Watching Run Control status is your first line of defense
Plus, many monitoring tools are available
Click on Launch Buttons on the left-hand side to start monitors

DaqMon is your gateway to many monitors, to start:

setup fer
daqmon

- Provides a quick glimpse status of all systems
- Click on component status buttons on the right for more information
- Help button (new)

VxMon

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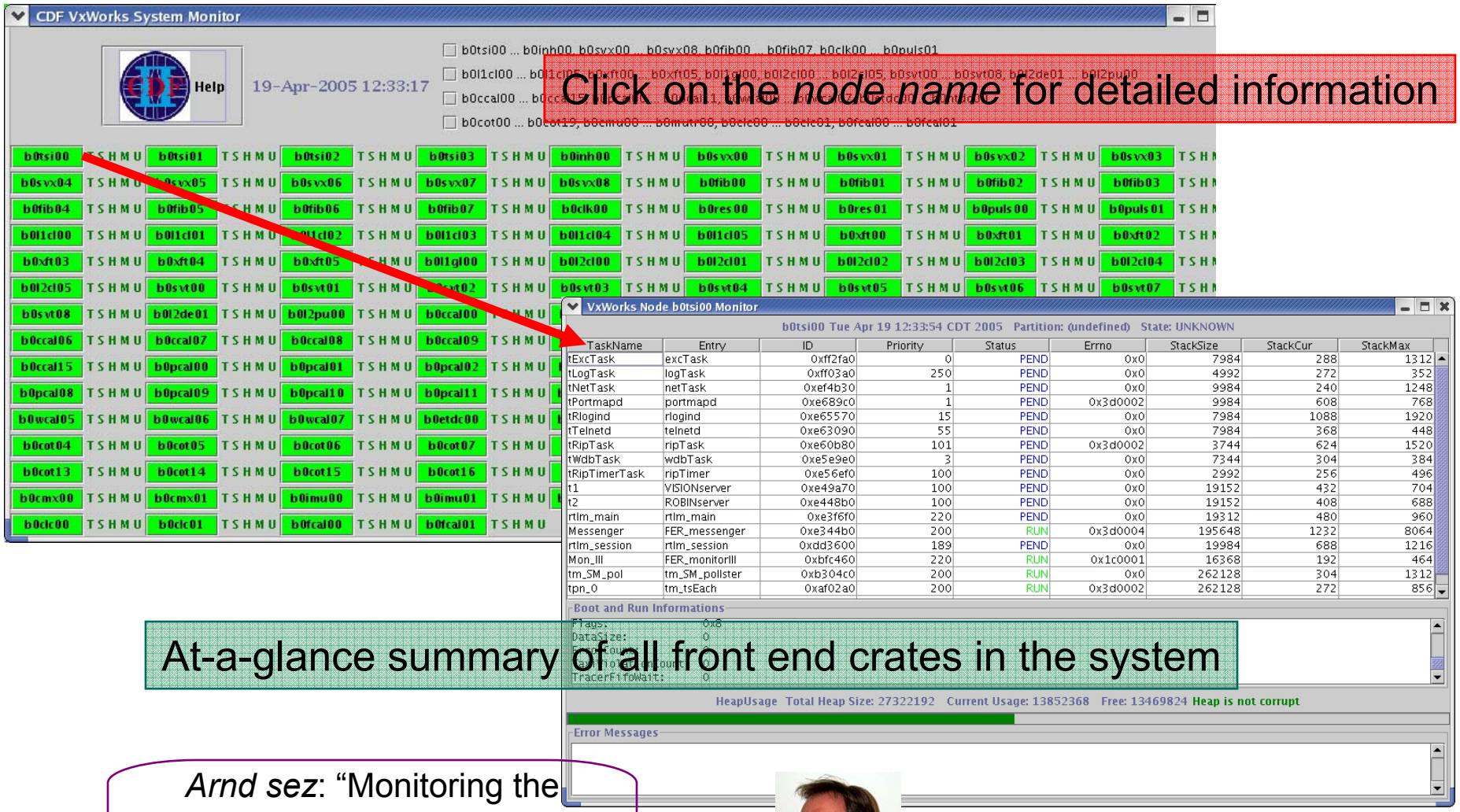

Arnd sez: “Monitoring the Front End crates is the Ace’s most important job”

ScalerMonitor

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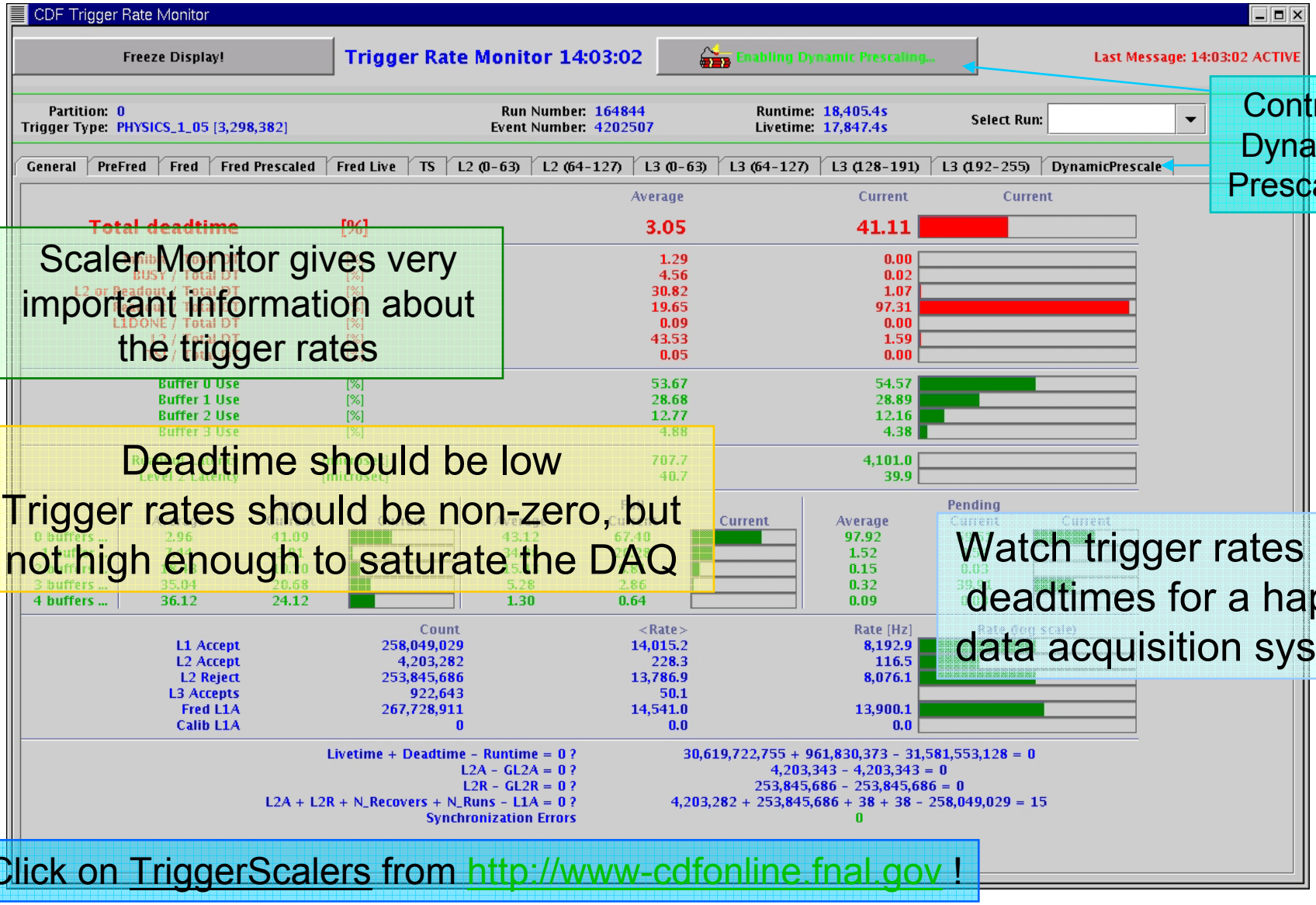

Controls Dynamic Prescaling

Scaler Monitor gives very important information about the trigger rates

Deadtime should be low

Trigger rates should be non-zero, but not high enough to saturate the DAQ

Watch trigger rates and deadtimes for a happy data acquisition system

Click on TriggerScalers from http://www-cdfonline.fnal.gov !

RunSummary Web Pages

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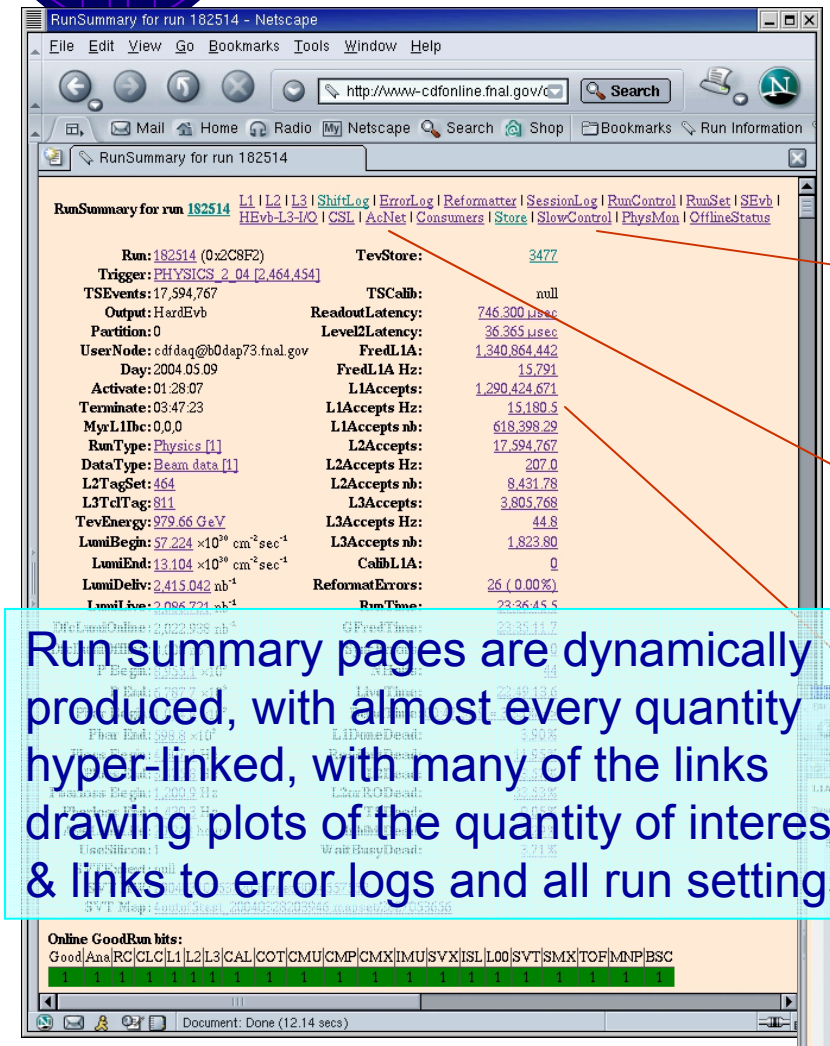
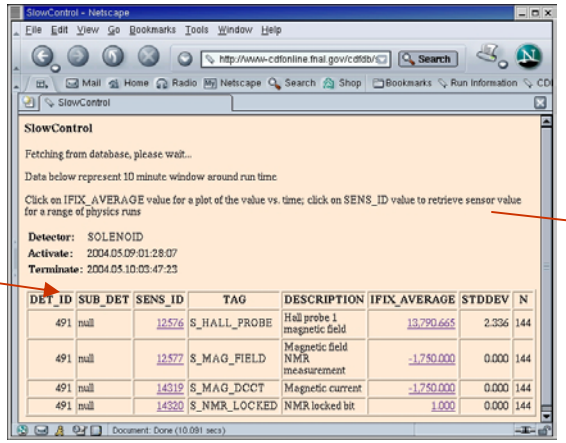
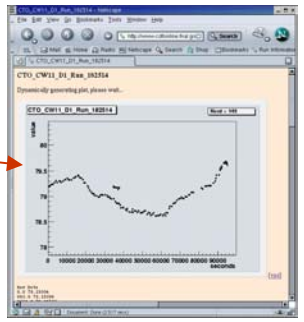
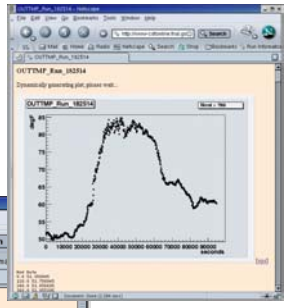




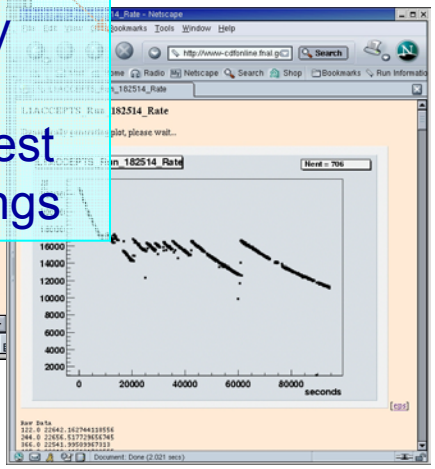


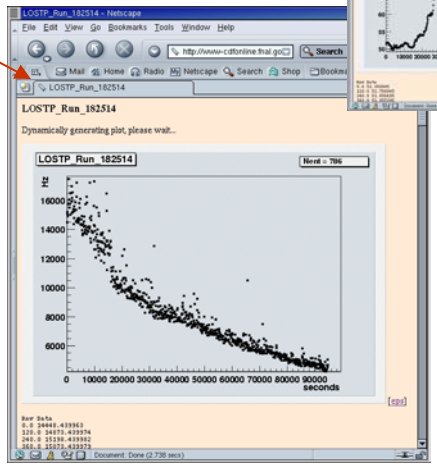
http://www-cdfonline.fnal.gov/

Follow **RunSum** and related links



Run summary pages are dynamically produced, with almost every quantity hyper-linked, with many of the links drawing plots of the quantity of interest & links to error logs and all run settings





Root used for plotting

Useful Monitoring Shell Commands

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First you "**setup fer**", then from the terminal shell prompt, type:

- **rcd**
  - ✓ Starts up display of all RunControl states
  - ✓ Useful between stores when lots of experts around
  - ✓ Also launchable from RunControl File menu
  - ✓ Click on partition to get list of crates owned
- **resources**
  - ✓ Book a partition and crates without starting up RunControl
- **mapvme**
  - ✓ Map the VME bus of the specified crate controller
  - ✓ Fast, non-GUI text display
  - ✓ Argument is crate CPU, e.g. b0cot05
- **daq**
  - ✓ Bring up CDF VME card and crate control panels for specified crates
- **partition**
  - ✓ Display current status of all partitions to screen
  - ✓ Fast, non-GUI text display
  - ✓ Optional argument for specific partition will print booked resources

Conclusion

- DAQ Ace's main responsibility is operation of Run Control

- Before your shift, come to CDF control room and try out Run Control features, learn from experienced Aces and other DAQ experts

- Don't understand a feature or warning? Don't ignore! Find out! Page experts if necessary!

- Have a look at new, clickable RunControl User's Guide:
  http://www-cdfonline.fnal.gov/runControlGuide

- Questions, comments, suggestions, complaints, send e-mail:
  cdf-rc-support@fnal.gov

- Urgent problems, page DAQ/RC at 722-7579